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California Orange Industry: Changing Production Patterns

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CALIFORNIA ORANGE INDUSTRY: CHANGING PRODUCTION PATTERNS

by

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INTRODUCTION AND SUMMARY

Introduction

The California-Arizona orange industry, long established, has been subject to considerable structural change. This continues to be so. Built on the fresh market outlets, the industry allocated some production into canned single-strength juice also. Thus, products were recognized as an alternative, although the fresh shipment market remained by far the dominant outlet. When frozen orange juice concentrate was introduced following World War II, the California orange industry entered that market also. But effective competitive pressures from Florida virtually compelled California to withdraw from this new utilization; thus, California continued to consider the fresh shipping outlet as the one to which it gave major attention. Florida now is heavily oriented toward the production of frozen orange juice concentrate, while California depends on the fresh orange market.

The changes in the California orange industry sketched above reflect developments in the structure of markets and the nature of the type of demand facing California orange growers. But in recent years, another type of structural change has been developing. In the years prior to World War II, southern California dominated the state's production of oranges. Fruit was grown in central California, although it was a relatively minor production area. But since World War II, and particularly during the past decade, central California has been taking on increased importance as an orange producing area. Rural-urban area development in the southern part of the state and the disappearance of orchards there, coupled with the acquisition of water in central California

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and its planting of orchards, have resulted in a restructuring of the southern and central districts as orange producing areas. Central California now stands beside southern California as a major production area. Hence, in production as well as in marketing, the California orange industry has been subject to structural change.

The changing structure of the California orange industry calls for a comparative analysis of the industry situation and prospects in the southern and central orange producing districts. These are the most important of the various shipping districts created by the federal marketing orders for navel and valencia oranges which were designated by the 1954 legislation.^{1/} Trends in production, acreage, yields, sizes, and production costs are involved.^{2/} Both the southern and central districts produce navel and valencia oranges.^{3/} Unique and

^{1/} Area descriptions of the districts may be found on the introductory maps, pages 2a and 2b, and are designated as follows: For navel oranges, District I (central), District II (southern), District III (Arizona-Desert-Valley), and District IV (Edison); for valencia oranges, District I (central), District II (southern), and District III (Arizona-Desert-Valley).

^{2/} All reference to acreage is to bearing acreage which is harvested, with the exception of the last section (Comparative Postwar Developments in Orange Production in California) in which nonbearing acreage is specifically discussed.

^{3/} In tracing production figures for the past 20 years, all figures in this report have been revised to the present definition of a standard carload--1,000 cartons at $37\frac{1}{2}$ pounds per carton.

Previous standard carload measurements were:

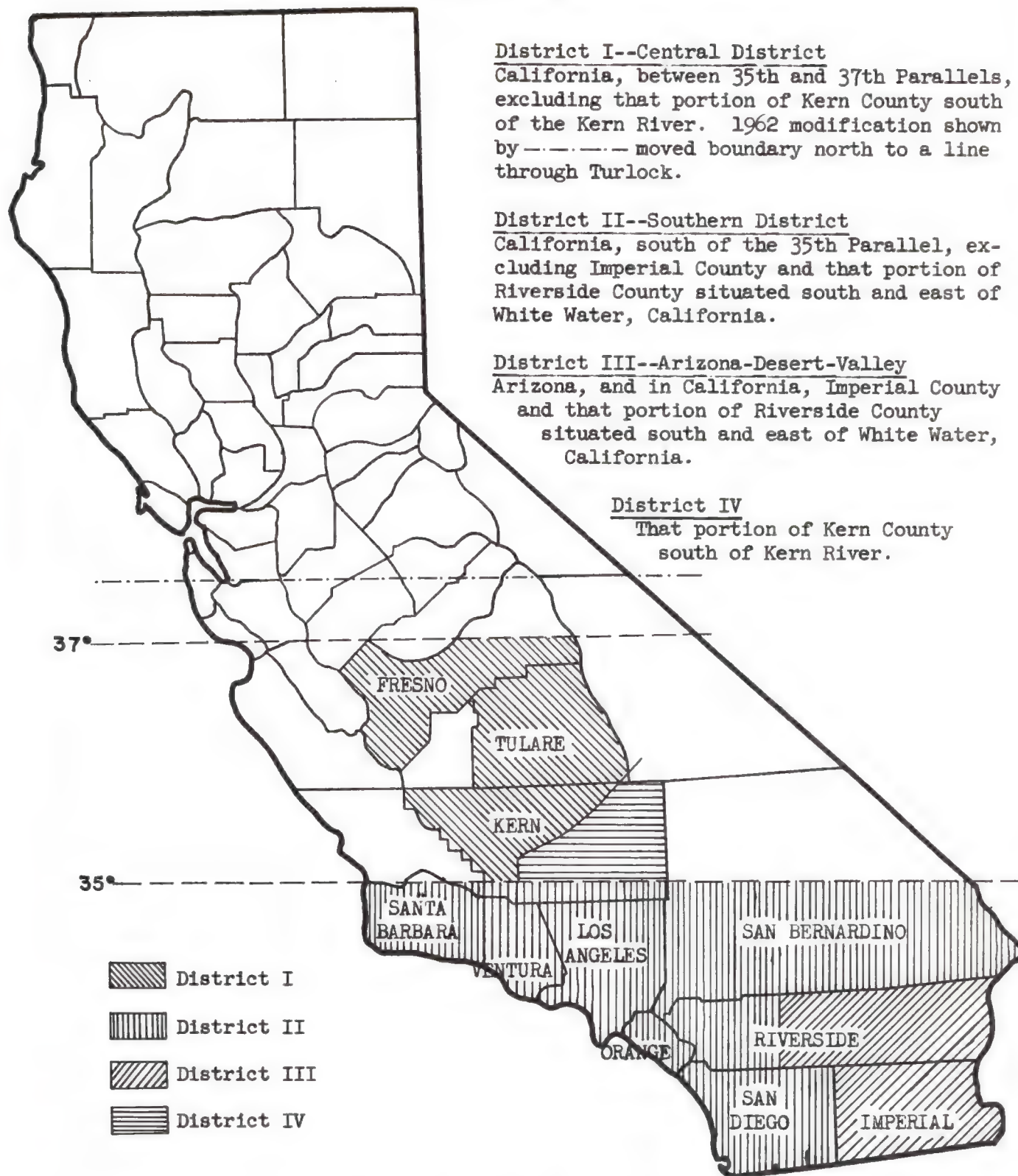
1941-42 to 1955-56	462 boxes at 77 pounds per box
1956-57 to 1958-59	924 cartons (half a box) at $37\frac{1}{2}$ pounds per carton (also quoted at $38\frac{1}{2}$ pounds gross weight during this period)
1959-60 to present	1,000 cartons at $37\frac{1}{2}$ pounds per carton

The estimated standard carload weight, therefore, was:

1941-42 to 1955-56	35,574 pounds
1956-57 to 1958-59	34,650 pounds
Current weight	37,500 pounds

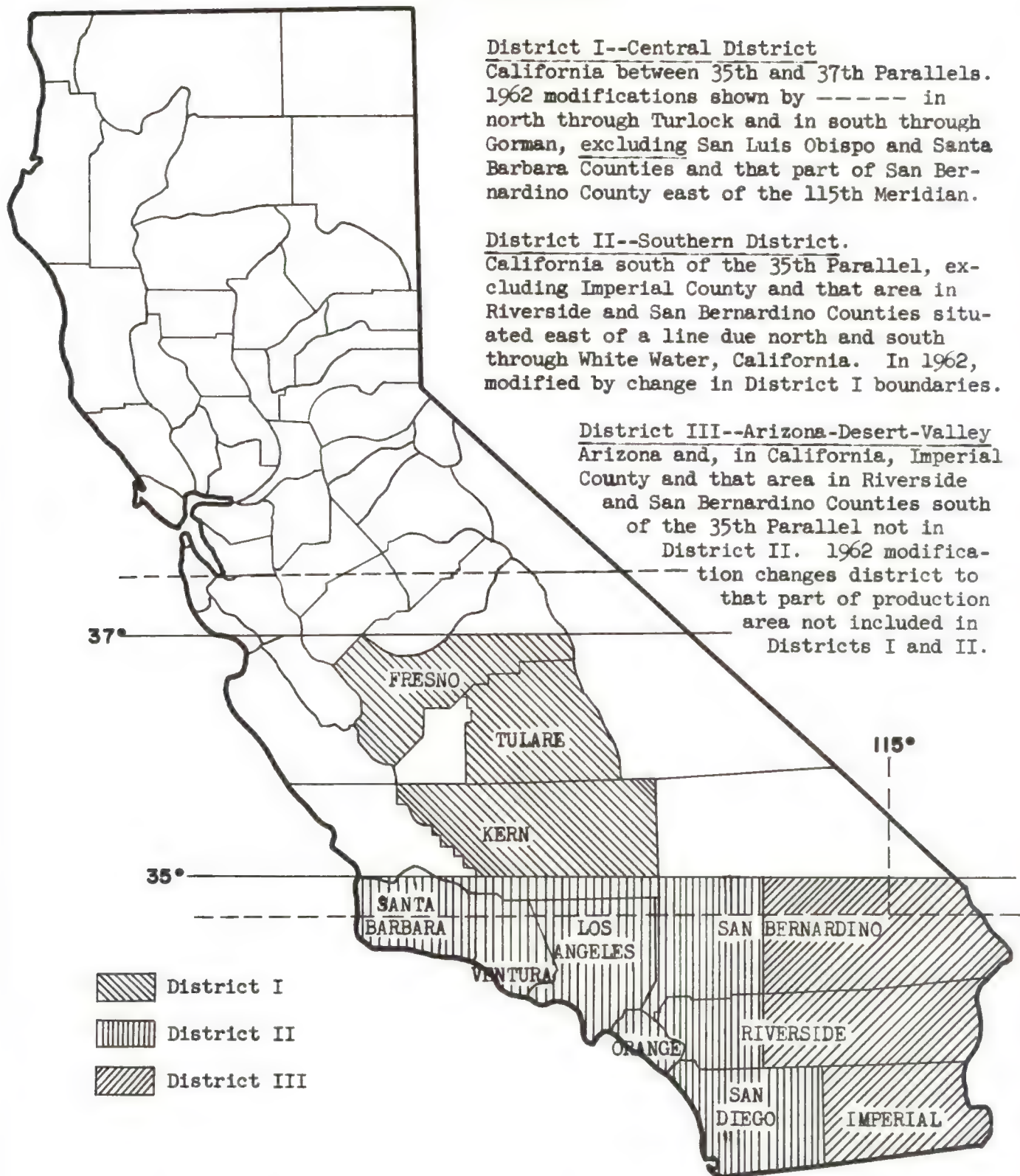
Following the lead of the statistical reports of both the Navel and Valencia Orange Administrative Committees and industry sources, the authors have made all revisions on the basis of 924/1,000 formula for all years prior to 1959-60. It must be recognized, however, that the revisions of earlier years are, therefore, slightly "light weight" because of the quoted difference in the actual weight of the standard carload as defined over time.

NAVEL ORANGES



Map 1. Navel Orange Prorate Districts (Federal Marketing Agreement 117 and Order No. 14, 1954, changed to Order 907, 1962)

VALENCIA ORANGES



Map 2. Valencia Orange Prorate Districts (Federal Marketing Agreement 117 and Order No. 22, 1954, changed to Order No. 908, 1962)

solitary shipping periods do not now exist for a single district variety. The two districts, as well as the two varieties, intermingle over time in shipments. One result is the overlapping of district shipments, by variety as well as by area. Shipments from the Arizona-Desert-Valley district further complicate the shipment overlap problem.

Developments in the California-Arizona orange industry suggest a continued reliance on the fresh market outlet. In contrast, as currently noted, the Florida orange industry remains strongly tied to the frozen orange juice concentrate market as the major outlet. In both California and Florida, prospects are for expanded production in the coming decade. For California that means continued supply pressure on the fresh orange market, and for Florida it means further supply pressure on the frozen orange juice concentrate market. The latter has been significantly invaded by "synthetics"--orange flavored drinks made without fruit--instead of natural orange juice. As Florida orange supplies increase, the pressure on the frozen concentrate market will spill over in the fresh orange market, having repercussions on the market outlet on which the California industry relies. Added to this is the prospect of additions to California's own orange supply. For reasons such as these, the industry is concerned with price prospects.

This report is part of an overall view of orange industry developments and prospects. Here attention is focused on the changing structural situation in the California orange producing industry. With this basic background, another report will be concerned with the prospective demand and price situation likely to face the California orange industry. To that end, production projections reflecting anticipated available supplies will be used. The supply anticipations, in turn, will reflect the interactions between the southern and central districts in California. For that reason, this report is oriented toward and emphasizes the changing supply structure of the two districts.

The two prorate districts to which this report devotes its major attention cover the two major production areas in California. As demarcated by the two federal marketing orders of 1954 (slightly modified in 1962), District II in southern California and District I in central California have between them produced over 90 percent of the navels and valencias of the California-Arizona region. The recent developments in District III, the Arizona-Desert-Valley area, are noted briefly for their future interest but are not an integral part of the more detailed analysis.

The statistical data on which the report depends and on which it has focused exclusive attention have been gathered by the navel and valencia administrative committees established by these federal marketing orders to regulate the marketing of California-Arizona oranges. The data reflect their definitions and demarcations. The existence of the marketing orders and districts have been taken as given and their rationale has not been questioned here. Another report could be developed covering other additional marketing alternatives or exploring other marketing channels than those under marketing orders, but they are not the subject of this study. Data developed during the single federal marketing order administration under which both varieties of oranges were regulated in the immediate postwar period have been treated and utilized in the same way. The statistical estimates offered for the two years in which oranges were marketed without control were obtained in large part from industry sources.

Thus, theoretical alternatives in market structure have not been the subject of this report. Rather, a detailed examination has been attempted of the actual producing and shipping performance of the two major California orange producing areas in the two decades since World War II. Growth trends and changes have been noted but with particular attention devoted to interdistrict relationships and with very special attention focused in the southern-central California shifts. It was, after all, this main shift in emphasis from southern California to the central district which highlighted, perhaps stimulated, much of the structural change in the California-Arizona orange industry of the past decade.

The following summary sets forth in skeleton form some of the leading highlights of this report.

Summary

Navel Oranges: Production and Utilization

Navel orange production in the combined southern and central districts has been trending downward, with the central district increases maintaining combined production from 15 to 20 percent below the immediate postwar years as the two districts shift position and the central district takes over as primary producer. In sharp contrast to upward production trends in central California, navel

orange production in the southern district has followed a downward trend during almost all of the past 20 years.

The downward trend in acreage harvested for navel oranges in the southern district has been continuous, although not quite as rapid in the past decade, resulting in decreases of over 50 percent since 1945-46. After a decade of stability in navel acreage harvested in the central district, annual increases have brought the current total to nearly 40,000 acres.

In the past decade, the pattern of increased production of navel oranges in the central district has been reflected in both acreage and yield, whereas the immediate postwar decade production increases were more strongly affected by yield alone. The southern district yield of navel oranges per acre harvested has been trending upward in recent years, although at lower absolute levels than that of the central district.

Fresh shipments of navels from southern California have been relatively stable--at about 7,500 carloads--for the past five years; this is about half the average for the immediate postwar period. In contrast, despite fluctuations in specific years, the central district now has the precedence in fresh navel oranges.

Relative utilization of navel production, while varying annually, is also somewhat different in the central and southern districts. A larger proportion of central production goes to fresh market channels; a correspondingly larger percentage of southern district production goes into export channels and also into processing.

Valencia Oranges: Production and Utilization

Valencias, grown heavily in the southern district, have nevertheless been subjected to a strong downward adjustment over the past two decades; valencias grown in the central district, although showing some elements of expanded production, have not shown other marked trends as yet. On the average, only 15-20 percent of the combined central and southern valencia orange production is grown in the central district. Even so, the valencia production in the central district is, on the average, 15 percent higher than in the immediate postwar period, while that of southern California is down nearly 50 percent.

Southern valencia acreage, although 10 times that of central in 1945-46, has now decreased to less than 5 times as great, while the central district has

narrowed the gap by its own increases over the last five years. The decrease in bearing acreage of valencias in the south has been the major determinate for falling production. Interaction of acreage and yield in southern valencias has been mixed, but falling acreage has been strong enough in the main to counter-act yield effects. In the central district, the yield pattern has dominated the valencia production pattern.

Major swings in valencia fresh shipments from the southern district have followed the downward trend of production, while the comparatively small volume of valencia fresh shipments from central California has not shown any strong annual trend. The absolute volume of fresh valencia shipments is much greater in the southern district, but the two districts ship about equal percentages of their own production into the domestic fresh market--an average of about half of each district's total production of valencias.

The pattern of valencias for processing has followed the total production pattern downward in southern California more closely than in the central district where absolute volume is relatively small. Southern California valencias are exported in three to four times the volume of those from central California; but this represents only an average 10 percent of the total southern valencia crop, while in past years the central district export percentages have been higher.

Trends in Orange Sizes and Size Distribution

Over the past two decades, southern district navel oranges show average annual fresh shipment sizes generally smaller than those of the central district crop. Thus, there is a slight tendency of the central district navel size distribution to include more of the larger sizes and fewer of the smaller sizes than in the southern district. Although this is also true in valencias, size differences or distribution measurements that can be noted are quite small between districts in both varieties. Navel orange annual crops show the central district with slightly larger sizes; valencias in the central district have also averaged slightly larger sizes over five of the past seven years. But annual variability of valencia sizes makes generalizations difficult.

The size measurements adopted in 1956-57 in fact designated additional and slightly smaller-sized orange classifications; possibly this was a de facto recognition of the tendency toward slightly smaller valencia oranges over time in both districts.

Length, Pattern, and Overlapping of District Shipments

We consider in detail a four-way breakdown of orange production--central navels, southern navels, central valencias, and southern valencias. Each in a certain sense may be considered as a separate commodity.

In examining the length and positioning of the central district navel orange season, no important changes over time are recorded; fresh shipments begin near the middle of November. The average length of the season shows more variation; in the mid-1950's, the shipping seasons lasted over 30 weeks into midsummer, but in recent years the 20-25 week season has returned, extending through April. The norm for beginning of southern navel shipments is late November-early December, with a May terminal date and an average season length of close to 27 weeks--slightly shorter than in earlier postwar years.

Central district valencias begin early in April, but the termination date shows great variation and considerable seasonal lengthening since 1953-54. The decreasing volume of southern valencia fresh shipments has not shown any persistent change in length or positioning of opening and closing dates. In general, after the fluctuations of the mid-1950's and despite differences in volume of the districts and over the years, the length of season measured in weeks of fresh shipment in each district has not retained any particular pattern of change.

The major characteristic of southern navel shipments is the continuity of pattern which has remained fixed over 20 years despite any other change. The pattern of within-season distribution of fresh shipments for central navels shows 10 percent of the crop shipped before three weeks of the season has passed and 25 percent of all annual volume within the next three weeks. Any annual variations until 1957 were shown in the shipment of the last 10 percent; since then, the slight lengthening is distributed within the season. Central valencia shipments also show some elongation of shipment of the last 10 percent; the shipment pattern shows little or no change over time in southern valencias.

The changing pattern of production of the two varieties in the two districts, combined with separate prorates for navels and valencias, changed somewhat the pattern of shipments and season lengths. There has been a shifting forward over time of central navel shipments which is stronger than any shift in southern navels which show more stability of pattern. In southern valencias the shift forward has been more marked than in navels but much less than in central navels.

Although not a new phenomenon, simultaneous shipments by two districts took on increased dimensions and importance during the mid-1950's. When the central and southern district navel fresh shipments are observed in their period of exclusively two-way overlap, two current conclusions are noted:

1. The volume of southern navel oranges shipped at the same time as central navels (usually from mid-December to mid-March) is now smaller but steadier than it was during the immediate post-war period.
2. The volume of central district navels shipped during this overlap period is not only greater than it was in the postwar years, but also it is larger in absolute terms than the volume of southern navels shipped at the same time.

In general, the overlap periods for the central district have lengthened, representing in the main an elongation of the central district navel shipping period.

In valencia overlapping shipments between districts, the southern district is so paramount in production that central district's volume is a very small percentage of the total, despite its lengthening periods of shipments.

In exclusive three-way overlap, the early 1950's showed a greater length of overlap in time and volume than any time before or since. Decreases are the result of decreasing southern district valencia production, realignments, and increases in four-way overlaps.

Four-way overlaps, where both districts are concurrently shipping navels and valencias, did not occur prior to 1952-53; thus, the proportions of this four-way overlap since that time really constitute what is regarded as the "overlap problem."

Setting aside the incompletely recorded period between marketing orders, the seven seasons from 1954 through 1961 showed four-way overlapping shipments of considerable volume ranging in duration from 6 to 15 weeks in time. Since 1960-61, this situation has changed; and in the past four years, the four-way overlap has ceased to include any significant volume of fresh shipments of oranges. The seasonal pattern of shipments of two orange varieties from two districts has returned to more traditional channels.

The only fresh shipments made alone on any regular basis (when considering just the two-district relationship) are made by southern valencias, generally

in August-October. With recognition of the Arizona-Desert-Valley district shipments, where the growth development is mainly in valencias, solitary district variety shipment no longer exists in actuality for California oranges, even if the overlap volume is often small.

Cultural Costs

When comparing navel and valencia orange cultural costs, California as a whole showed some fluctuations in cost per acre before 1954-55; after this date, reported costs advanced sharply and valencia costs substantially exceeded navels.

By 1963, navel oranges were said to cost \$475 per acre on the tree and valencias \$505 per acre to produce. Cost per carton, as reported, has fluctuated more for navels than valencias but was almost equal for the two in 1956-57. Since then, navel cultural cost per carton has been recorded as exceeding valencia costs as both increased. The sizable cost changes recorded for 1963 are difficult to explain except by differences in data collection; new techniques for developing cost series are being explored.

In estimating district differences in cultural costs, both varieties have to be lumped because of available data. (Tulare is taken roughly to indicate central district; Orange, Los Angeles, Ventura, and San Diego, as southern district representatives.) Both districts show rising costs in varying degrees between 1945 and 1951, with higher costs per acre in the southern district but higher costs per carton in many years in the central district. Sharply higher costs per acre have been noted in the southern district since 1954-55--higher than the earlier decade and higher than the central district. Higher per-carton costs are also recorded for southern district oranges with the exception of 1960-1962. Based on available data, therefore, it must be concluded that southern district cultural costs per bearing acre and per carton are less favorable than in the central district.

Comparative Postwar Developments in California-Arizona Orange Production

Despite fluctuations over the past decade, total orange production is about the same for both varieties (combined) as it was 10 years ago for the California-Arizona production area as a whole. Valencia production is currently about 15 percent greater than navel production.

Over the last 10 years, about 80 percent of navel production has gone to fresh shipments; of valencias, about 50 percent. In the same period, 35-40 percent of valencias has gone into products. In addition, an average of over 10 percent of fresh valencias has gone into export channels.

The upward trend has been steady in navel orange bearing acreage in the central district since 1958; nonbearing acreage has almost doubled since 1958. In addition, more trees per acre are currently planted in areas of new planting. In the southern district with downward navel acreage trends, nonbearing acreage is showing slight increases; thus, present bearing acreage decreases are occurring at a somewhat slower rate.

Because of both acreage increases and increased yield, continued strong growth in navel orange productive capacity of the central district is anticipated rather than noticeable increases in the southern district. Added to the cost of production advantage noted for the central district, navel oranges show slightly larger size and a slightly larger percent going into fresh market channels.

In valencia orange production, the southern district has been dominant in California, but greater than 50 percent reduction in bearing acreage in the south has occurred since 1945-46. The pace of decrease has slowed in the last several years as nonbearing acreage of valencias in the southern district has been increasing since 1957. But acreage shifts to the San Joaquin have overshadowed the measurable increases in the south.

Growth of the Arizona-Desert-Valley citrus industry in both navel and valencia oranges (although largely in the latter) may modify the shift of the center of the citrus industry to central California which has characterized the past two decades. However, as yet this new area has not shown comparative yield to match central district experience.

In combined orange production, navel and valencia, the striking growth of the central district--nearly doubling in production during the 20 years--is evident; the southern district orange production is at half the figure it was in 1945-46. Comparing central and southern districts as producers of combined orange varieties, total acreage figures are now close because of central district increases and southern decreases. In combined yield, the southern district led in the earlier postwar period, but the central district showed higher average cartons per acre for the five years after the adoption of the separate marketing orders. Now the two areas are close to equality in this respect.

Economic-cultural conditions favored central district navels in the mid-1950's. The impressive growth in the central district orange production and the shift in emphasis to that area has been as much the result of decrease in the south as it has been to increases in the central district itself. Thus, the decrease of orange production in the south, coupled with increases in the central district, has resulted in a narrowing of the south's dominance.

Industry sources now indicate continued new valencia plantings at a higher level in the southern district and in the Arizona-Desert-Valley district and strong increases in new navel plantings in the central district. Since the size and stability of southern valencia fresh shipments dominated the production pattern of oranges in California, they are essentially more subject to overlapping than any others. This district and variety are thus more potentially vulnerable in what is called the overlap problem.

The change for all districts (particularly in District II, southern California, and District III, Arizona-Desert-Valley) in the 1960's seems to be toward increasing the proportion of new valencia acreage and thus projected production. If anticipated demand for valencia oranges is not able to absorb the contemplated production with favorable returns to growers and shippers, allocation of fresh shipments will again be of major importance; and the length of overlap, now apparently stabilized, may be subject to shifts and adjustments similar to the high growth period in navels of the mid-1950's. The situation may not be quite parallel nor the "smoothing out" quite so possible if the acreage increases continue to be concentrated in valencia production.

NAVEL ORANGES: PRODUCTION AND UTILIZATION

Production

Postwar Trends: District and Variety

Central Navels.^{1/}--A basic indication of the growing market supply pressure of central navels was their production trend during the immediate postwar years (Table 1). Beginning with 9,000 cars in 1945-46, within a decade central navels had increased in production to over 14,000 standard carloads. A persistent upward trend did not prevail throughout as marked fluctuations occurred between some of the years.

In fact, a bumper central navel crop of 1946-47 which produced a peak production of 14,800 carloads was followed by a decline and then dropped to the low production of 1948-49 because of the heavy frost that year, after which some recovery occurred. But the sharp upward trend in central navel production actually began in 1952-53.

Averaging near 14,000 carloads annually by 1956-57, production of central navels hit a new peak figure of over 19,000 carloads in 1958-59 which was not approached again until 1963-64 when 18,431 carloads were produced. The peak 1958-59 production year was followed by the wind and frost years of 1960-61 and 1961-62. Thereafter, central navel production rather dramatically regained its levels of the later 1950's, giving every indication in the last two years of retaining the dominant production position. The strong decreases in production of 1960 through 1962 make the usual five-year averages for the past years not very meaningful, but the 1962-1964 years seem to assure a return to the higher figures of the late 1950's.

Southern Navels.--In sharp contrast with the production trend of central navels, that of southern navels trended down heavily during the postwar years (see Table 1). Again, year-to-year fluctuations occur, but the downward trend in southern navel production is unmistakable.

Starting with 25,499 carloads in 1945-46, the level of southern navel production a decade later had decreased by 10,000 carloads. In the 1953-1957

^{1/} The addition of District IV (Edison), which would add the rest of Kern County to this area, would not change the figures substantially and might introduce more "southern" influence to the definition of the area as a whole.

TABLE 1

Navel Production: Central and Southern Districts

Crop year	Central	Southern
	carloads	
1945-46	9,001	25,499
1946-47	14,799	23,331
1947-48	13,125	23,903
1948-49	7,599	15,626
1949-50	8,759	21,512
1950-51	8,300	19,902
1951-52	7,918	11,923
1952-53	11,079	20,514
1953-54	12,829	15,177
1954-55	14,689	15,210
1955-56	13,359	15,962
1956-57	14,425	15,462
1957-58	11,744	5,469
1958-59	19,292	13,152
1959-60	15,578	10,051
1960-61	8,629	8,756
1961-62	5,851	8,666
1962-63	14,541	9,470
1963-64	18,431	10,883

Source: See page 181.

period, there was a plateau of production of 15,500 carloads. After the disastrous 1957-58 year, southern navel production never reached that plateau again. From 1958-59, during four years the production of navel oranges in District II decreased from 13,000 to 8,700 carloads. In 1962-63 and 1963-64, the increases were about 1,000 carloads annually but did not bring southern navel production back to the level of the 1950's.

Central and Southern Compared.--The reasons for the differing behavior in production of navels in the central and southern districts are considered later when acreage and yield trends are reviewed. But in preparation for such review, the relative trends in navel production are emphasized in Table 2 where indexes of production show clear percentage trends on a comparative basis. It should be noted that navel orange production in the two districts as a whole, although trending downward over the two decades, was essentially maintained by the shifts in production to the central district; thus, combined production figures in the last decade averaged 15-20 percent lower than the immediate postwar years.

Table 3 illustrates the differential trends as represented by the percentage distribution of navel production between the central and southern districts. Over 70 percent of navel production of the two districts was grown in District II in 1945-46. Although the change in position was not absolutely reversed, nonetheless nearly 63 percent of the combined total was produced in District I by 1963-64. For several years in the mid-1950's, navel production was divided evenly between the southern and central districts but, with two years' exception, the central district has produced more than half the combined total navel production since 1956-57.

The differential trends in the central and southern production of navels are indicative of the changing positions in the two districts. But to obtain a meaningful understanding of the behavior in navel production trends, it is necessary to look behind them and consider what has occurred in bearing acreage and yield.

Bearing Acreage

Central Navels.--Bearing acreage is one of the two basic determinants of production. In light of what has occurred in central navel production reviewed above, what can be said about the behavior of central navel bearing acreage?

TABLE 2

Indexes of Navel Production: Central and
Southern Districts

Crop year	Central	Southern
	1945-46 = 100	
1945-46	100	100
1946-47	164	91
1947-48	146	94
1948-49	84	61
1949-50	97	84
1950-51	92	78
1951-52	88	47
1952-53	123	80
1953-54	143	60
1954-55	163	60
1955-56	148	63
1956-57	160	61
1957-58	130	21
1958-59	214	52
1959-60	173	39
1960-61	96	34
1961-62	65	34
1962-63	162	37
1963-64	205	43

Source: Based on Table 1.

TABLE 3

Navel Production: Percentage Distribution
Central and Southern Districts

Crop year	Central	Southern
	percent	
1945-46	26.1	73.9
1946-47	38.8	61.1
1947-48	35.4	64.6
1948-49	32.7	67.3
1949-50	28.9	71.1
1950-51	29.4	70.6
1951-52	39.9	60.1
1952-53	35.1	64.9
1953-54	45.8	54.2
1954-55	49.1	50.9
1955-56	45.6	54.4
1956-57	48.3	51.7
1957-58	68.2	31.8
1958-59	59.5	40.5
1959-60	60.8	39.2
1960-61	49.6	50.4
1961-62	40.3	59.7
1962-63	60.6	39.4
1963-64	62.9	37.1

Source: Based on Table 1.

For the first postwar decade, the bearing acreage of navels in the central district was remarkably stable. In 1945-46, the reported acreage harvested in District I was 29,317 acres (see Table 4). With slight fluctuations in an overall downward trend, 28,971 acres were harvested in 1957-58. From that year onward to the present, however, there has been a reversal of trend, and steady gains in acreage have been noted annually. In 1963-64 close to 40,000 acres were harvested--an increase of more than 35 percent over 1945-46.

It is clear that the strong upward trend in central navel production was not accounted for in most part by expansion of bearing acreage during the first decade; but after 1958, the increase in acreage has been a definite influence on the production of navel oranges originating in the central district.

Southern Navels.--In contrast to the central district, shown in Table 4, the bearing acreage of southern navels reflects a distinct downward trend during the postwar years. With 56,613 acres bearing navels in the southern district in 1945-46--almost double the acreage of the central district--the decline in acreage was persistent for the decade following, with the single exception of 1949-50 when a resurgence after the previous bad freeze was recorded. Thereafter, the declines were less great but nonetheless continuous; and by 1963-64, just over 26,000 acres were harvested in District II--less than half the number of acres that had grown navel oranges in the southern district in 1945-46.

Central and Southern Compared.--These data indicate that the downward trend in southern navel production during the postwar years is accounted for in substantial part by the downward trend in bearing acreage. Table 5 shows the relative trends in the two districts.

While central navel acreage changed very little during a dozen years after World War II, southern acreage decreased with more or less rapidity during the entire period under observation. Since 1953-54, central navel acreage edged upward annually, with 1957-58 a minor exception. After several years, acreage expanded rapidly in the central district illustrating the recognized shift in citrus acreage from southern district to the newly developed land in central district. Thus, by 1965 it is expected that harvested acreage will have increased 50 percent over the 1945-46 figure in District I and decreased 55 percent in District II. Total navel acreage harvested in the two combined districts meanwhile is nearly 20,000 acres less in 1963-64 than it was in 1945-46.

TABLE 4

Navel Harvested Acreage: Central and
Southern Districts

Crop year	Central	Southern
	acres	
1945-46	29,317	56,613
1946-47	29,674	56,067
1947-48	29,553	54,729
1948-49	29,686	49,345
1949-50	29,245	51,263
1950-51	29,273	50,279
1951-52	a/	
1952-53		
1953-54	28,001	41,708
1954-55	28,148	38,543
1955-56	28,179	34,781
1956-57	28,784	32,904
1957-58	28,971	30,226
1958-59	30,381	30,351
1959-60	32,081	29,797
1960-61	33,062	28,464
1961-62	35,380	27,664
1962-63	37,402	26,610
1963-64	39,793	26,136

a/ Blanks indicate comparable data not available
for the two years when a fresh shipping market-
ing order was not operating.

Source: See page 181.

TABLE 5

Indexes of Navel Acreage: Central and
Southern Districts

Crop year	Central	Southern
	1945-46 = 100	
1945-46	100	100
1946-47	101	99
1947-48	101	97
1948-49	101	87
1949-50	100	91
1950-51	100	89
1951-52	a/	
1952-53		
1953-54	96	74
1954-55	96	68
1955-56	96	61
1956-57	98	58
1957-58	99	53
1958-59	104	54
1959-60	109	53
1960-61	113	50
1961-62	121	49
1962-63	128	47
1963-64	136	46
1964-65	150	45

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 4.

Yield

Central and Southern Compared.--The other basic determinant of production is yield per bearing acre. Several points emerge from study of Table 6 showing district yields of navels. In both districts, the navel yield per acre may show extreme variation from year to year. In large part, this will usually be explained by specific conditions of climate.

For the decade after World War II, the yield appeared to fluctuate more in the central district than in the southern district where acreage could be assumed to be older and relatively established. During the second decade under observation, it continued to be true that fluctuations in yield per acre harvested were more noticeable in District I than in the decreasing acreage in District II. The record high yield year of 1958-59 for central navels showed 635 cartons per acre harvested, a single figure not equaled before or since in any district. It is so much higher than any other observation that it is almost suspect for this reason. The high yield years in the southern district--1955-56 and 1956-57, when yields averaged 464 cartons per bearing acre--are not so "out of line" with expected highs based on longer experience.

Relative Yield Trends.--The comparative trends in yield for central and southern navels can be emphasized by the use of indexes which adjust for the differential levels of yield and reflect only the differential trends, shown in Table 7.

The high yield of 1946-47 for central navels was an early indication of the years to come. The yield of that one year was to be approximately the average yield of the seven years after 1953-54. The index shown in the last few years has been at a much lower level, particularly influenced by the two severe freezing damage years between 1960 and 1962. The rising trend to a high yield level of the early 1960's might be indicated by the indexes shown in the last two years. Southern navel yields were not particularly high but were relatively stable in the earlier years shown. With the exception of the two years 1955-56 and 1956-57, however, they have tended to stabilize at somewhat lower levels in the decade since 1953-54. The higher index shown for 1963-64 may be indicative of a return to earlier heights since it is the fourth year of upward trend of increased yield in the southern district.

In comparative terms, yields in the central district have continued to be higher than the base year 1945-46 since 1953-54. With two years' exception, this has not been true of the southern district navel orange yield.

TABLE 6

Navel Yield: Central and Southern Districts

Crop year	Central cartons per acre harvested	Southern
1945-46	307	450
1946-47	499	416
1947-48	444	437
1948-49	256	317
1949-50	300	420
1950-51	284	396
1951-52	a/	
1952-53		
1953-54	458	364
1954-55	522	395
1955-56	474	459
1956-57	501	470
1957-58	405	181
1958-59	635	433
1959-60	486	337
1960-61	261	308
1961-62	165	313
1962-63	389	356
1963-64	463	416

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

TABLE 7

Indexes of Navel Yield: Central and
Southern Districts

Crop year	Central	Southern
	1945-46 = 100	
1945-46	100	100
1946-47	163	92
1947-48	145	97
1948-49	83	70
1949-50	98	93
1950-51	93	88
1951-52	a/	
1952-53		
1953-54	149	81
1954-55	170	88
1955-56	154	102
1956-57	163	104
1957-58	132	40
1958-59	207	96
1959-60	158	75
1960-61	85	68
1961-62	54	70
1962-63	127	79
1963-64	151	92

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 6.

Interaction of Acreage and Yield on Production

Central Navels.--By bringing together the trends and fluctuations in harvested acreage and yield, the actual central navel production may be explained (see Table 8). In the columns for central navels, the indexes (1945-46 = 100) for production, acreage, and yield are noted. It may be clearly seen that in view of the relatively stable trend in acreage through 1958-59 the pattern of production of central navels in most part has been determined by the pattern of yield in the postwar decade. This is reflected by the high degree to which the production and yield patterns during the postwar years conform to each other.

Since 1958, however, the pattern of increased production in the central district has reflected the upward trend in both acreage and yield. The influence of increased acreage has been a steady factor since its index has risen annually from 1957-58 through 1963-64, showing an overall increase of 32 percent. The yield index has fluctuated throughout the last five years, with the two low yield seasons in a row followed by a return to higher but not peak levels in the last two years.

Southern Navels.--When the columns for southern navels are inspected, a different picture emerges. In contrast to central navels of the postwar period, the trends in both bearing acreage and yield contributed to the trend in production of southern navels during the earlier years. Prior to 1951-52, the downward trend in southern navel bearing acreage influenced the downward trend in production, but the latter was also influenced by the declining trend in yield, whose annual fluctuations are reflected in corresponding year-to-year changes in production.

While acreage declined steadily, but not rapidly, yield rose in a similar fashion. After the very bad 1957-58 season, in which production was less than 25 percent of the 1945-46 figure, return has been made to index levels showing the same characteristics as the earlier 1950's. Acreage has continued its downward trend, the index of yield has fluctuated annually but more often upward, and production has been relatively stable at an average level of approximately 40 percent of the production of 1945-46. It is clear that, without fluctuating yields with some upward trend, southern navel production would have further receded as acreage declined rather than continue at relatively stable though somewhat lower levels.

TABLE 8

Indexes of Navel Production, Acreage, and Yield:
Central and Southern Districts

Crop year	Central			Southern		
	Produc- tion	Acreage	Yield	Produc- tion	Acreage	Yield
	1945-46 = 100					
1945-46	100	100	100	100	100	100
1946-47	164	101	163	91	99	92
1947-48	146	101	145	94	97	97
1948-49	84	101	83	61	87	70
1949-50	97	100	98	84	91	93
1950-51	92	100	93	78	89	88
1951-52	99	a/		57		
1952-53	128			82		
1953-54	143	96	149	60	74	81
1954-55	163	96	170	60	68	88
1955-56	148	96	154	63	61	102
1956-57	160	98	163	61	58	104
1957-58	130	99	132	21	53	40
1958-59	214	104	207	52	54	96
1959-60	173	109	158	39	53	75
1960-61	96	113	85	34	50	68
1961-62	65	121	51	34	49	70
1962-63	162	128	127	37	47	79
1963-64	205	136	151	43	46	92

a/ Blanks indicate comparable data not available for the two years when a fresh shipping market order was not operating.

Source: Tables 2, 5, and 7.

Utilization

Navel oranges are considered as a fresh shipping and fresh eating fruit. Their characteristics, in terms of eating quality, juice content, and sugar-acid ratio, make them more adaptable for fresh use than for processing. While it is true that the bulk of navels are shipped fresh, there are quantities each year which are processed because of grade or size characteristics which make the fruit economically unacceptable for fresh shipment. The relationship of fresh shipments to total production is of considerable interest. The differential in positions of central and southern navels in annual fresh shipments is, therefore, a relevant consideration.

Basic Factual Considerations

In this regard, the allocation to the various utilization possibilities is taken as given, as is done throughout this report. The separate prorate districts record their weekly allocations to each utilization, and such overall decisions are officially made by the administrative committee for each orange variety on the authority of the two separate marketing orders.

The general background for this decision making and for the interrelation of the committees with other phases of the California-Arizona orange industry is, of course, not only an important and relevant factor but is a fascinating study as well. However, the subject of this report is more narrowly conceived and thus does not deal with the development of either the single federal marketing order of the 1940's or the two separate orders of more recent years. The basic prorate districts, the establishment of prorate fresh shipment allocations, the allocation to other uses of additional production, and finally the ultimate choice of specific marketing channels by industry itself, are accepted as given for the purpose of our immediate research into interdistrict relationships.

Fresh Shipments

The movement of fresh shipments and the processed navels for both the central and southern districts are shown in Table 9. (For clarity, the total annual production is also repeated for each district.) The close correspondence between the annual production of central navels and the quantities shipped fresh is clearly seen. The generally close correspondence between production and fresh shipments of southern navels is also evident through 1958-59. For

TABLE 9
Navel Utilization: Fresh Shipments and Processed
Central and Southern Districts

Crop year	Central			Southern		
	Total produc- tion	Fresh ship- ments	Proc- essed	Total produc- tion	Fresh ship- ments	Proc- essed
	carloads					
1945-46	9,001	8,279	290	25,499	20,715	2,897
1946-47	14,799	12,670	1,082	23,331	19,346	2,052
1947-48	13,125	11,200	1,193	23,903	18,830	3,456
1948-49	7,599	6,664	508	15,626	10,429	3,924
1949-50	8,760	7,216	940	21,512	17,031	2,869
1950-51	8,300	7,379	359	19,903	17,149	1,742
1951-52 ^{a/}	7,918			11,923		
1952-53 ^{a/}	11,079			20,514		
1953-54	12,829	10,634	1,533 ^{b/}	15,177	10,771	3,247 ^{b/}
1954-55	14,689	12,293	1,015	15,210	10,843	3,110
1955-56	13,359	11,363	1,015	15,962	12,783	2,224
1956-57	14,425	11,822	1,218	15,462	12,276	2,201
1957-58	11,744	10,831	312	5,469	4,842	417
1958-59	19,293	16,148	2,044	13,152	10,383	2,107
1959-60	15,578	13,296	1,182	10,051	7,545	2,082
1960-61	8,629	7,887	314	8,756	7,508	708
1961-62	5,851	5,424	240	8,666	7,008	1,144
1962-63	14,541	9,253	4,799	9,470	7,194	1,742
1963-64	18,431	15,801	1,984	10,883	7,415	2,560

^{a/} Estimated by authors from trade data for the two years when a fresh shipping marketing order was not operating; utilization data not available in comparable fashion.

^{b/} Includes "other."

Source: See page 181.

the past five years, since the 1959-60 season, however, fresh shipments from District II have been relatively stable at an average figure near 7,300 carloads annually despite the total production figure. This annual fresh-shipment figure for the district is less than half that of the early postwar years.

From inspection of Table 9 one may fairly well distinguish the extent to which fresh shipments in each of the districts dominate the utilization of their production. But a more precise and meaningful comparison may be made through the use of measures of proportionate amounts of navel production shipped fresh, as shown in Table 10.

These data reflect the tendency for a somewhat larger percentage of production to be shipped fresh in central district than in southern. In most years the district percentages are not markedly different. What appears important is that in all the postwar years, with the exception of 1962-63, central navels have benefited proportionately more (in terms of being channeled into the higher-returns fresh market) than have southern navels. This occurred to a significant degree even in 1952-53 when a fresh shipping marketing order prorated was not in operation. Thus, although annual navel fresh shipments have generally changed with production in each of the districts, the correlation between fresh marketings and production of navels has been higher for the central than the southern district. In the early postwar years, fresh navel marketings from the southern district far outdistanced those from the central district in absolute terms; but, with a downward trend in southern navels shipped fresh and a generally upward trend in central navels shipped fresh between 1950 and 1959, the comparative situation changed markedly.

Except for the disastrous southern navel year of 1957-58, the two districts were making close to equal fresh shipments annually from 1953 through 1959. While District II, in recovery, stabilized at a level of fresh shipments between 7,000 and 7,500 carloads, District I ended the period of the 1960's, after two bad seasons, by shipping fresh over twice that number of carloads from its area in 1963-64. The trend seems to indicate clearly that, despite specific annual crop conditions and the fluctuations in fresh shipments they cause, the central district now has taken a precedence in fresh navel oranges.

Processed

The difference between production and regulated fresh shipments is not completely accounted for by processed fruit alone, since some oranges not

TABLE 10

Navel Utilization: Regulated Fresh Shipments
as a Percentage of Total Production
Central and Southern Districts

Crop year	Central	Southern
	percent	
1945-46	92.0	81.2
1946-47	85.6	82.9
1947-48	85.3	78.8
1948-49	87.6	66.7
1949-50	82.4	79.2
1950-51	88.9	86.2
1951-52	a/	
1952-53		
1953-54	82.9	71.0
1954-55	83.7	71.3
1955-56	85.1	80.1
1956-57	82.0	79.4
1957-58	92.2	88.5
1958-59	83.7	79.0
1959-60	85.4	75.1
1960-61	91.4	85.8
1961-62	92.7	80.9
1962-63	63.6	76.0
1963-64	85.7	68.1

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 9.

included in "fresh shipments" are classified under "exports" and "other." While Table 9 shows the actual amount of production used for processing (expressed in carloads), Table 11 shows processed production alone as a percentage of the total annual production in each of the two districts, central and southern.

Processing has not assumed very great importance for central district navel oranges with a single year's exception, 1962-63, when it took on salvage proportions. In 1958-59 and 1963-64, more than 10.5 percent moved into processing channels; but generally throughout the postwar years, despite increases in total production in the district, processing utilization was the destination for less than 1,500 carloads.

Southern navels for processing have exceeded those from the central district in absolute volume throughout the period, but particularly in the first postwar decade. Despite wide annual variations and in the face of the downward trend in southern navel production, that district's processed volume has varied around a fairly level trend during the postwar years and thereafter. Processed southern navels, therefore, have varied widely around a level of 2,200 carloads.

Some significant points emerge from Table 11. In all of the postwar years, with the single exception of 1962-63, the southern district has sent a larger percentage of its navel crop to processing than has the central district. For central navels, the experience indicates a little over 7 percent of the crop for processing, with the annual data fluctuating around that average figure as a stable and level trend, omitting the one unique year 1962-63. For southern navels, in comparison, the postwar years reflect an average of almost 15 percent of the crop processed. Consequently, in a relative sense--in terms of the navel crop volume available for disposition--the central district has consistently been in a position of allocating a smaller proportion to the less favorable returns outlet (processing) than has the southern district for its navels.

As in fresh shipments, in which the central district has enjoyed a relatively larger allocation of its navel crops, the central district has also enjoyed a preferred position with respect to the relative volume of production processed. Such a comparative situation in utilization of the navel crop in the two districts is superimposed upon the situation in which southern navel production and fresh shipments have been trending downward in the postwar years, while central navel production and fresh shipments since 1950-51 have been following a generally upward course.

TABLE 11

Navel Utilization: Processed as a Percentage of
Total Production, Central and Southern Districts

Crop year	Central	Southern
	percent	
1945-46	3.2	11.4
1946-47	7.3	8.8
1947-48	9.1	14.5
1948-49	6.7	25.1
1949-50	10.7	13.3
1950-51	4.3	8.8
1951-52	a/	
1952-53		
1953-54	12.0 ^{b/}	21.4 ^{b/}
1954-55	6.9	20.4
1955-56	7.6	13.9
1956-57	8.4	14.2
1957-58	2.7	7.6
1958-59	10.6	16.0
1959-60	7.6	20.7
1960-61	3.6	8.1
1961-62	4.1	13.2
1962-63	33.0	18.4
1963-64	10.8	23.5

a/ Blanks indicate comparable data not available
for the two years when a fresh shipping market-
ing order was not operating.

b/ Includes "other."

Source: Based on Table 9.

Exports

Exports of the navel orange crop in each district are to be added to "fresh shipments subject to regulation" in order to obtain a complete account of total commercial allocation to the fresh market. Shipments to Canada and to Alaska, even before admission to statehood, are treated as domestic rather than export shipments. In absolute terms (carloads), exports of southern navels exceeded those of central navels through the first postwar decade. Beginning with the 1956-57 season, however, the position was reversed, and for four years the central district was the major shipper. Since 1960-61, however, the southern district has again resumed its role as the larger exporter of navel oranges (see Table 12).

In terms of percent of the navel crop exported, both districts had been about equal until the last four years. Since 1960-61, the District II percentage of total production sent into the export market has not been unusually high, but the District I percentage has been notably lower than in previous years. In 1963-64 nearly 7 percent of the southern district navel crop was exported, while less than 2 percent of central district navels was shipped abroad.

In both districts navels are exported less than valencias in terms of carloads as well as percent of crop. In the central district, however, exports of valencias make up a much larger proportion of the crop than do navels. Such a marked difference between valencias and navels does not prevail in the southern district, although trends in recent years seem to indicate that southern district valencia exports are moving in larger proportion to total production and to navel orange exports than before.

Central and Southern Compared

The proportionate distributions of the navel crops in the central and southern districts are shown in Table 13. The more dominant usage for fresh shipment under regulation is evident in both of the districts, averaging about 85 percent of the central navels and close to 80 percent of the southern navels for the postwar years as a whole as well as for recent years. Yet, more variability is evident in the year-to-year navel regulated fresh shipment proportion in the southern district than in the central district. The same applies to the proportions of navels processed. These differential characteristics, with those noted earlier, comprise the major differences apparent in the relative usage distribution of the navel crops in the central and southern districts.

TABLE 12

Navel Utilization: Exports
Central and Southern Districts

Crop year	Central	Southern	Central	Southern
	carloads		percent of production	
1945-46	373	1,384	4.1	5.4
1946-47	941	1,311	6.4	5.6
1947-48	588	882	4.5	3.7
1948-49	329	489	4.3	3.1
1949-50	276	858	3.2	4.0
1950-51	246	800	3.0	4.0
1951-52	a/			
1952-53				
1953-54	662	1,160	5.2	7.6
1954-55	899	1,049	6.1	6.9
1955-56	418	789	3.1	4.9
1956-57	900	868	6.2	5.6
1957-58	370	163	3.2	3.0
1958-59	798	589	4.1	4.5
1959-60	837	306	5.4	3.0
1960-61	217	451	2.5	5.2
1961-62	69	357	1.2	4.1
1962-63	122	449	0.8	4.7
1963-64	318	737	1.7	6.8

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

TABLE 13
Navel Utilization: Percentage Distribution
Central and Southern Districts

Crop year	Central			Southern		
	Fresh ship-ments	Exports	Proc-essed and other	Fresh ship-ments	Exports	Proc-essed and other
	percent					
1945-46	92.0	4.1	5.0	81.2	5.4	13.4
1946-47	85.6	6.4	9.5	82.9	5.6	11.5
1947-48	85.3	4.5	11.4	78.8	3.7	17.6
1948-49	87.6	4.3	9.3	66.7	3.1	30.1
1949-50	82.4	3.2	15.9	79.2	4.0	16.8
1950-51	88.9	3.0	8.9	86.2	4.0	9.9
1951-52	a/					
1952-53						
1953-54	82.9	5.2	12.0	71.0	7.6	21.4
1954-55	83.7	6.1	10.2	71.3	6.9	21.8
1955-56	85.1	3.1	11.8	80.1	4.9	15.0
1956-57	82.0	6.2	11.8	79.4	5.6	14.9
1957-58	92.2	3.2	4.7	88.5	3.0	8.5
1958-59	83.7	4.1	12.2	79.0	4.5	16.6
1959-60	85.4	5.4	9.3	75.1	3.0	21.9
1960-61	91.4	2.5	6.1	85.8	5.2	9.1
1961-62	92.7	1.2	6.1	80.9	4.1	15.0
1962-63	63.6	0.8	35.5	76.0	4.7	19.3
1963-64	85.7	1.7	12.6	68.1	6.8	25.1

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Sources: Based on tables 10 and 12; also, see page 181.

VALENCIA ORANGES: PRODUCTION AND UTILIZATION

Production

Postwar Trends: District and Variety

Southern Valencias.--Valencia oranges, widely known as "summer oranges," are generally marketed during the May-October period when fresh orange supplies from other major producing states are not available or are shipped only in small amounts. California valencias are grown in both the southern and central districts, although much more heavily in the former.

The production of valencias in the southern district has reflected a unique development during the postwar years. Beginning with about 47,000 cars in 1946, southern valencias had fallen to just about 34,000 carloads by 1956-57. This decline over a period of a dozen years did not develop smoothly; on the contrary, an abrupt fall occurred in 1954 after which only partial recovery occurred. Although the low point of 22,292 carloads was in 1962, 1963-64 saw only 24,500 carloads produced in the southern district. Thus, the average production of valencia oranges in District II in the last five years has been slightly over 26,000 carloads, while during the first five postwar years the district averaged over 50,000 carloads annually (see Table 14). When the high (in 1947) and low (in 1961) of production in the 19 years are considered, the decline was over 50 percent; and when the change from the first five-year average to the last five-year average is measured, it amounts to a decrease in production of slightly under 50 percent. This definitely represents an unusually extreme downward adjustment.

Central Valencias.--The production of valencia oranges in the central district during the postwar years reflects no unusual trend characteristics. Beginning with 4,934 cars in 1946, the increase of the following year was not to be duplicated for 10 years. By the 1956-57 season, 6,703 cars of central valencias were produced. Since that year, fluctuating production has been characteristic of the district with 1963-64 production reaching an all-time high of 8,230 carloads. Although central district valencia production has shown elements of considerable expansion from time to time, a more or less stable level seems evident since 1954. But the three years of high production (1957, 1959, and 1964) may foreshadow further expanded production--a question considered later in this report where prospective developments are considered.

TABLE 14

Valencia Production: Southern and Central Districts

Crop year	Southern	Central
	standard carloads	
1945-46	47,170	4,934
1946-47	60,579	6,507
1947-48	48,418	4,783
1948-49	47,504	1,667
1949-50	48,832	2,875
1950-51	56,312	4,285
1951-52	28,852	3,153
1952-53	35,846	4,739
1953-54	29,959	5,619
1954-55	42,088	5,793
1955-56	40,669	5,351
1956-57	33,956	6,703
1957-58	22,637	5,126
1958-59	39,040	7,324
1959-60	28,964	5,501
1960-61	28,428	3,358
1961-62	22,292	3,633
1962-63	27,155	5,026
1963-64	24,532	8,230

Source: See page 181.

Southern and Central Compared.--For comparison, the division of valencia production between the southern and central districts is shown in Table 15. In view of the different levels of valencia production in the two districts, their relative trends are, in addition, indicated by the indexes in Table 16.

The central district recovery from the 1949 frost damage and the advance to higher levels of production, the abrupt entrance of the southern district into a new and lower level of production with the 1954 crop, and the differing impact of the climatic problems in each district in the latter decade are all clearly evident. Aside from the year-to-year fluctuations, the indexes indicate that after nearly 20 years the southern district production was down nearly 50 percent as we have noted and that, the exceptional years 1961, 1962, and 1964 aside, the central district production might be, on the average, over 15 percent above that of 1946.

Bearing Acreage

Southern Valencias.--As a determinant of production, bearing acreage has played a dominant role in southern valencias. A downward trend which was evident during most of the postwar years accelerated during the 1950's (see Table 17). Harvested acreage in District II was recorded at 137,087 acres in 1945-46. By 1957-1960, an average of 75,000 acres was harvested annually; and since then the decreases in acreage have continued, though not as rapidly as during the previous 10 years. By 1963, therefore, 56,357 acres of valencia oranges were harvested in the southern district.

Central Valencias.--The bearing acreage of valencias in the central district has followed a much less spectacular course than the southern valencias (see Table 17). But in the central area, also, acreage followed an irregular course, with a downward trend for nearly a decade after World War II. From 1953-54 to the present, however, the impression is a quite different one. A slow increase begins, followed by greater increases in the early 1960's, and a large increase in acreage is recorded between 1962-63 and 1963-64. If the entire period is considered, therefore, there is an overall increase in acreage in the central district valencias between 1945-46 and 1963-64 of 40 percent, but there had been 15 years of relatively stable acreage before noticeable increases commenced in 1961-62.

Southern and Central Compared.--In view of the contrasting levels of bearing acreage of valencias in the southern and central districts, adjustment is made for clarification through indexes shown in Table 18.

TABLE 15

Valencia Production: Percentage Distribution
Southern and Central Districts

Crop year	Southern	Central
	percent	
1945-46	90.5	9.5
1946-47	90.3	9.7
1947-48	91.0	9.0
1948-49	96.6	3.4
1949-50	94.4	5.6
1950-51	92.9	7.1
1951-52	90.1	9.9
1952-53	88.3	11.7
1953-54	84.2	15.8
1954-55	87.9	12.1
1955-56	88.4	11.6
1956-57	83.5	16.5
1957-58	81.5	18.5
1958-59	84.2	15.8
1959-60	84.0	16.0
1960-61	89.4	10.6
1961-62	86.0	14.0
1962-63	84.4	15.6
1963-64	74.9	25.1

Source: Based on Table 14.

TABLE 16

Indexes of Valencia Production: Southern and
Central Districts

Crop year	Southern	Central
	1945-46 = 100	
1945-46	100	100
1946-47	128	132
1947-48	103	97
1948-49	101	34
1949-50	104	58
1950-51	119	87
1951-52	61	64
1952-53	76	96
1953-54	64	114
1954-55	89	117
1955-56	86	108
1956-57	72	136
1957-58	48	104
1958-59	83	148
1959-60	61	111
1960-61	60	68
1961-62	47	74
1962-63	58	102
1963-64	52	167

Source: Based on Table 14.

TABLE 17

Valencia Harvested Acreage: Southern and Central Districts

Crop year	Southern	Central
	acres	
1945-46	137,087	13,103
1946-47	137,242	12,607
1947-48	135,123	12,818
1948-49	127,012	7,067
1949-50	126,323	10,518
1950-51	124,177	11,945
1951-52	a/	
1952-53		
1953-54	102,349	11,470
1954-55	92,495	11,428
1955-56	84,128	11,409
1956-57	79,080	11,456
1957-58	75,123	11,543
1958-59	73,202	11,920
1959-60	70,316	12,150
1960-61	65,239	12,556
1961-62	61,807	13,734
1962-63	58,051	14,713
1963-64	56,357	18,547

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

TABLE 18

Indexes of Valencia Acreage: Southern
and Central Districts

Crop year	Southern	Central
	1945-46 = 100	
1945-46	100	100
1946-47	100	96
1947-48	99	98
1948-49	93	54
1949-50	92	80
1950-51	91	91
1951-52	<u>a/</u>	
1952-53		
1953-54	75	88
1954-55	67	87
1955-56	61	87
1956-57	58	87
1957-58	55	88
1958-59	53	91
1959-60	51	93
1960-61	48	96
1961-62	45	105
1962-63	42	112
1963-64	41	142

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 17.

These indexes first reflect the downward trend experienced by both districts during the postwar years. Until 1950-51, the decline in acreage harvested followed about the same relative trends in both districts. In that year both districts showed acreage to be about 91 percent of the 1945-46 level, even though the acreage involved in District II was 10 times that of District I. District data are not available for the two intervening years but, after the marketing order of 1954, comparable figures were again at hand and District I acreage levels, although slightly lower, were relatively stable; while District II, which had fallen to 75 percent of the 1945-46 level, decreased at a rapid rate thereafter. Small increases in the District I index of acreage were in contrast to continued declines in District II until in 1960-61 central valencia acreage harvested was almost that which had been recorded in 1945-46. District II acreage was less than half that of the 1945-46 level.

Since that year, the indexes have continued to show opposite trends-- District I now steadily increasing and District II steadily decreasing. It is clear, therefore, that the declines in harvested acreage of southern valencias contribute to their downward trend in production. But the trend in acreage of central valencias does not, by itself, explain the fluctuating acreage in that district. Thus, yield trends are next considered.

Yield

Southern and Central Compared.--As one of the basic determinants of production, yield per acre may be expressed in terms of cartons per acre. For comparative purposes, such valencia yield measures are given in Table 19.

In many of the years since 1953-54, the central district had the higher yield, but poor crop years in the district have had a more drastic yield effect in general in this district than in the southern district. Several years have shown the two districts to have quite similar yield experience; 1963-64 was one in which the central district had a 444-carton yield per acre, and the southern district yield was 435 cartons. The central district reflects both the lowest valencia yield (223 cartons per acre in 1961-62) and the highest yield (614 in 1958-59) during the observed period. The southern district, also, has experienced some extreme yield years (292 cartons per acre in 1953-54 and 533 in 1958-59), but the variation has generally been less than in the central district valencias.

TABLE 19

Valencia Yield: Southern and Central Districts

Crop year	Southern	Central
	cartons per acre harvested	
1945-46	344	377
1946-47	441	516
1947-48	358	373
1948-49	374	236
1949-50	387	273
1950-51	453	359
1951-52	a/	
1952-53		
1953-54	293	490
1954-55	455	507
1955-56	483	469
1956-57	429	585
1957-58	301	444
1958-59	533	614
1959-60	412	453
1960-61	436	267
1961-62	361	265
1962-63	468	342
1963-64	435	444

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

The yield data of the past several years by themselves, however, do not establish projections. Influences other than climate and culture may affect each district. For example, recent plantings are on the basis of an increased number of trees per acre. Thus, although from an economic and money-returns point of view the comparative yield pattern is meaningful, it may not be fully subject to accurate projection in terms of physical productivity on a district basis.

Relative Yield Trends.--The index data, shown in Table 20, indicates the changes in yield per bearing acre from year to year with the differential trends in relative yields of the two districts emphasized.

The relatively similar yield tendency which had been characteristic of the two districts for the period as a whole was considerably altered in the first three years of the 1960's. The fact that yields had been higher on the average in both districts until 1960, despite acreage trends, strongly affected production. Since 1960, however, this has been true of the southern district valencia oranges, but it has been acreage increases in the central district rather than yield trends that have influenced production strongly.

Interaction of Acreage and Yield on Production

Southern and Central Compared.--The trends in valencia acreage and yield are now brought together to see how their interaction affects the production trend of southern and central valencias. Indexes of production, acreage, and yield are observed in parallel columns in Table 21.

The downward trend in southern valencia acreage from 1945-46 to 1950-51 was just about offset by the upward trend in yield so that the production trend was rather flat during that period. Since 1953-54, the yield and acreage influences for southern valencias interacted in a mixed way. The downward course of production over the period as a whole mainly represents a falling acreage strong enough to counteract yield effects.

The pattern of central valencia bearing acreage was particularly effective in determining production during the 1947-48 to 1950-51 period. From 1953-54 to 1960-61, with the remarkable stability in bearing acreage, the yield pattern dominated the production pattern in central valencias. Production fell during poor yield years while acreage was increasing. But production jumped ahead remarkably in 1963-64 when both acreage and yield showed outstanding gains.

TABLE 20

Indexes of Valencia Yield: Southern
and Central Districts

Crop year	Southern	Central
	1945-46 = 100	
1945-46	100	100
1946-47	128	137
1947-48	104	99
1948-49	109	63
1949-50	112	73
1950-51	132	95
1951-52	a/	
1952-53		
1953-54	85	130
1954-55	132	134
1955-56	140	124
1956-57	125	155
1957-58	88	118
1958-59	155	163
1959-60	120	120
1960-61	127	71
1961-62	105	70
1962-63	136	91
1963-64	126	118

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 19.

TABLE 21

Indexes of Valencia Production, Acreage, and Yield:
Southern and Central Districts

Crop year	Southern			Central		
	Produc- tion	Acreage	Yield	Produc- tion	Acreage	Yield
	1945-46 = 100					
1945-46	100	100	100	100	100	100
1946-47	128	100	128	132	96	137
1947-48	103	99	104	97	98	99
1948-49	101	93	109	34	54	63
1949-50	104	92	112	58	80	73
1950-51	119	91	132	87	91	95
1951-52	99	a/		85		
1952-53	112			126		
1953-54	64	75	85	114	88	130
1954-55	89	67	132	117	87	134
1955-56	86	61	140	108	87	124
1956-57	72	58	125	136	87	155
1957-58	48	55	88	104	88	118
1958-59	83	53	155	148	91	163
1959-60	61	51	120	111	93	120
1960-61	60	48	127	68	96	71
1961-62	47	45	105	74	105	70
1962-63	58	42	136	102	112	91
1963-64	52	41	127	167	142	118

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Tables 16, 18, and 20.

Utilization

Valencia oranges are adaptable for both fresh shipping and processing into orange juice products. In view of the higher returns from fresh shipments, valencias allocated to processing represent sizes and grades of fruit not acceptable for fresh shipments or quantities not prorated for the fresh market under the federal marketing agreement order. Regulated fresh shipments, processed outlets, and exports are now reviewed as exemplified in the two districts (see Table 22).

Fresh Shipments

The significant downward trend in fresh shipments of southern district valencias during the postwar years is particularly noticeable. The major swings in fresh market shipments follow the major swings of production with a few differences.

The sharp downward trend in regulated fresh shipments of southern valencias to 1949-50 was followed by fluctuations during the 1950's which denoted mainly a decline, interrupted only by the 1958-59 shipments, and somewhat higher 1960-61 fresh shipments. In average terms, the volume of southern valencia fresh shipments during the past several years has been less than half of the volume shipped in the early postwar years.

In the central district, the fresh shipment of valencias has experienced a much different development. The volume of central valencias shipped fresh is much smaller than that of the southern district. But in the central district no pronounced trend is evident. The level of the postwar years was matched by shipments in the mid-1950's, but the increased shipments of the late 1950's were not maintained, and for several years fresh shipments from the central district were lower than in the postwar years. These recent short crop years have now been erased, however, by the 1963-64 crop in which the highest volume of fresh shipments ever made by the central district was established. District I shipped 5,519 carloads in 1963-64, an amount which was over half the volume of valencia oranges shipped by the southern district.

Table 23 indicates the relative position of fresh shipments in the disposition of the southern and central valencia crops. The percentages of production shipped fresh under regulation do not include exports; they are

TABLE 22

Valencia Utilization: Fresh Shipments and Processed
Southern and Central Districts

Crop year	Southern			Central		
	Total produc- tion	Fresh shipments	Processed	Total produc- tion	Fresh shipments	Processed
	standard carloads					
1945-46	47,169	34,758	10,484	4,934	3,871	373
1946-47	60,579	41,160	15,954	6,507	3,910	1,472
1947-48	48,419	32,287	13,015	4,783	3,434	699
1948-49	47,504	25,637	19,508	1,667	1,077	467
1949-50	48,832	24,512	20,805	2,875	1,056	1,457
1950-51	56,312	27,556	23,130	4,285	2,212	1,371
1951-52	28,852	a/		3,153		
1952-53	35,846			4,739		
1953-54	29,939	18,628	8,591	5,619	2,742	518
1954-55	42,088	21,142	16,569	5,793	3,302	891
1955-56	40,669	19,368	16,179	5,351	1,120	896
1956-57	33,917	17,350	12,877	6,703	3,491	1,213
1957-58	22,637	15,429	5,278	5,126	3,971	468
1958-59	39,040	20,281	15,157	7,324	4,148	1,677
1959-60	28,964	14,543	11,475	5,501	4,186	676
1960-61	28,428	15,002	9,027	3,358	2,396	649
1961-62	22,292	11,640	6,769	3,633	1,835	1,715
1962-63	27,155	12,754	10,618	5,026	2,013	2,968
1963-64	24,532	10,386	11,210	8,230	5,519	1,593

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

TABLE 23

Valencia Utilization: Regulated Fresh Shipments
as a Percentage of Total Production
Southern and Central Districts

Crop year	Southern	Central
	percent	
1945-46	73.7	78.4
1946-47	67.9	60.1
1947-48	66.7	71.8
1948-49	54.0	64.6
1949-50	50.2	36.7
1950-51	48.9	51.6
1951-52	a/	
1952-53		
1953-54	62.2	48.8
1954-55	50.2	57.0
1955-56	47.6	20.9
1956-57	51.2	52.1
1957-58	68.2	77.5
1958-59	52.0	56.6
1959-60	50.2	76.1
1960-61	52.8	71.4
1961-62	52.2	50.5
1962-63	47.0	40.1
1963-64	42.3	67.1

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 22.

considered separately later. During the postwar years no persistent differential pattern existed between the two districts. In fact, when observed over two decades, there is little or no recognizable difference over the period as a whole. It should be remembered that the absolute volume in the southern district is of greater magnitude, but the two districts seem to ship over time about an equal percentage of their separate production as fresh shipments; and this represents, on the average, about half of each district's total production of valencia oranges.

Processed

A second major disposition of the valencia crop is processing, including juice and other orange products. Processed southern valencias showed no early persistent trend. In the reduction of absolute volume for processing in the later years, wide annual fluctuations have been characteristic. The trend for processing in the last 10 years has been downward. The general pattern of southern valencias for processing has pretty well conformed to the production pattern, and that of fresh shipments as well. It is interesting to note, in passing, that the last year of record, 1963-64, is one of the two years of exception to this conformity. During that year, 10,386 carloads of valencias were subject to regulation and shipped fresh. This was a decrease of somewhat over 2,000 cars from the previous year's production and fresh shipments. However, processing took just over 11,000 cars, an increase of 500 cars from the year before.

In central valencias, for which the processed volume had been small in absolute terms (averaging about 1,000 cars annually for the first postwar decade), there had been no pronounced trend during the earlier period. Since the mid-1950's, however, even though the absolute volume is still relatively small (averaging closer to 1,500 cars annually), the trend seems to show an average upward turn for the last three years in a row. Also, it may be noted that the pattern of central valencias processed has not followed the production pattern, as is the usual case in southern valencias.

In view of the much different levels of production and volume of valencias processed in the two districts, it is necessary to consider the relative positions of processing in the southern and central districts. The data shown in Table 24 indicate that in most years the proportion of the southern valencia crop processed substantially exceeds the corresponding proportion of the

TABLE 24

Valencia Utilization: Processed as
a Percentage of Total Production
Southern and Central Districts

Crop year	Southern	Central
	percent	
1945-46	22.2	7.6
1946-47	26.3	22.6
1947-48	26.9	14.6
1948-49	41.1	28.0
1949-50	42.6	50.7
1950-51	41.1	32.0
1951-52	a/	
1952-53		
1953-54	28.7	9.2
1954-55	39.4	15.4
1955-56	39.8	16.7
1956-57	38.0	18.1
1957-58	23.3	9.1
1958-59	38.8	22.9
1959-60	39.6	12.3
1960-61	31.8	19.3
1961-62	30.4	47.2
1962-63	39.1	59.1
1963-64	45.7	19.4

a/ Blanks indicate no comparable data available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Table 23.

central valencia crop. Only in the "bad" years--the short crop year of 1961-62 and the bad frost years of 1949-50 and 1962-63--was the central district percentage processed in excess of the southern proportion of the crop processed.

During the years in which the processing percentages in each of the districts were relatively stable, the central district average proportion of valencias allotted to processing was in the range of 17 percent and that of the southern district near 37 percent. In the fluctuations of the last three years, however, the short crop year of 1961-62 in the central district found a very high percentage of the crop going into products, while the southern district percentage was not increased. The next year both districts sent a very high proportion of the crop into the processed outlet. In 1963-64 the positions reversed and the southern district processed figure was at an all-time high proportion for the district, while the central district's processed percentage was near average.

Exports

In addition to valencia oranges shipped fresh under regulation, there are fresh oranges exported. Here, also, there are distinctions between the southern and central valencias as summarized in Table 25.

The valencia export data emphasize two essential points. In terms of carloads, the southern valencia exports generally far exceed in volume the exports of central valencias. In percentage of respective crops, however, there have been different experiences in the two districts and in the two decades under consideration.

For the first postwar decade, the central district shipped a substantially larger proportion of its crop into export channels than did the southern district. In fact, this continued to be the case through 1959. District II exported an average of over 9 percent of its annual crop during the 1950's, while District I exports fluctuated between 20 percent and 61 percent without establishing any relative stability. In comparison, the percentage of exports shipped by the central district was higher than that of the southern district, although it represented a much smaller volume.

During the 1960's, however, the District II export percentage was higher than that of District I, in large part because of the short crop experienced in the central district. In 1963-64, the two districts exported percentages of crop only 2 percentage points apart (as had been true in 1959-60). This

TABLE 25

Valencia Utilization: Exports, Southern and Central Districts

Crop year	Southern	Central	Southern	Central
	carloads		percent of	production
1945-46	1,190	630	2.5	12.8
1946-47	2,702	981	4.5	15.1
1947-48	2,364	560	4.9	11.7
1948-49	1,614	82	3.4	4.9
1949-50	3,031	284	6.2	9.9
1950-51	5,182	549	9.2	12.8
1951-52	a/			
1952-53				
1953-54	2,330	2,286	7.8	40.7
1954-55	3,944	1,521	9.4	26.3
1955-56	4,781	3,265	11.8	61.0
1956-57	3,406	1,933	10.0	28.8
1957 58	1,715	640	7.6	12.5
1958-59	3,258	1,449	8.4	19.8
1959-60	2,613	592	9.0	10.8
1960-61	3,986	278	14.0	8.3
1961-62	3,610	49	16.2	1.3
1962-63	3,512	21	12.9	b/
1963-64	2,416	977	9.9	11.9

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

b/ Less than 0.5 percent.

Source: See page 181.

meant in absolute volume, however, that District II exported slightly less than three times the shipments of District I in 1963-64, but in 1959-60 it had been four times the central district's export volume. This could mean that exports, which had assumed a significant position in the disposition of the central valencia crop in the 1950's, would resume this importance.

Southern and Central Compared

Having reviewed the major uses of the valencia crops in the southern and central districts, it is now necessary to see how the uses compare in the two districts in an overall view. Referring to Table 26 where utilization percentages are shown in a parallel fashion for both southern and central valencias, we can draw several tentative comparisons based on nearly 20 years' experience.

Exports had proved to be an important and growing channel for fresh shipments for the central district throughout most of the years of production expansion after 1950. This meant that in most of those same years processing was less important to District I as an outlet for the annual crop than it had been in the immediate postwar period. However, in the 1960's when several short crop years were experienced, a much larger proportion of the crop went into products; and it has been only in the most recent season that the export utilization has regained something of its earlier proportions. The fresh shipment proportion has fluctuated strikingly throughout. In the immediate postwar period, 60-80 percent of the central district valencias moved into domestic fresh shipment channels. This was not to be true again until the few years beginning with 1957-58. If the alternative uses of valencias are ranked in the order of profitability--fresh shipments subject to regulation, exports, then products--it may be noted that central valencias have irregularly shifted position during the postwar years. But the most attractive alternative--fresh shipments to the domestic market--has generally taken on increased relative importance since 1951-52 for central valencias when there has not been a major crop difficulty to interfere with production as a whole.

Indications are that for southern valencias the relative allocation patterns have been much more stable than for central valencias. For example, exports have shown a general upward trend during the two decades, but they have in general maintained more or less the same relationship to products as a utilization channel of southern valencias over the period as a whole.

TABLE 26

Valencia Utilization: Percentage Distribution
Southern and Central Districts

Crop year	Southern			Central		
	Fresh shipments	Exports	Processed and other	Fresh shipments	Exports	Processed and other
	percent					
1945-46	73.7	2.5	23.8	78.4	12.8	8.8
1946-47	67.9	4.5	27.5	60.1	15.1	24.8
1947-48	66.7	4.9	28.5	71.8	11.7	16.5
1948-49	54.0	3.4	42.7	64.6	4.9	30.5
1949-50	50.2	6.2	43.6	36.7	9.9	53.4
1950-51	48.9	9.2	41.9	51.6	12.8	35.6
1951-52	a/					
1952-53						
1953-54	62.2	7.8	30.0	48.8	40.7	10.5
1954-55	50.2	9.4	40.4	57.0	26.3	16.8
1955-56	47.6	11.8	40.6	20.9	61.0	18.1
1956-57	51.2	10.0	38.8	52.1	28.8	19.1
1957-58	68.2	7.6	24.2	77.5	12.5	10.0
1958-59	52.0	8.4	39.7	56.6	19.8	23.6
1959-60	50.2	9.0	40.8	76.1	10.8	13.2
1960-61	52.8	14.0	33.3	71.4	8.3	20.4
1961-62	52.2	16.2	31.9	50.5	1.3	48.2
1962-63	47.0	12.9	40.1	40.1	b/	59.6
1963-64	42.3	9.9	47.8	67.1	11.9	21.1

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

b/ Less than 0.5 percent.

Source: See page 181.

Domestic fresh shipments, on the other hand, have shown a tendency to decrease somewhat in proportion to the entire crop utilization over the period as a whole so that they have taken on an average somewhat less than 50 percent of the southern district valencia crop over the last six years. Although keeping in mind the much higher actual volume represented by these percentages, it is still true that the higher profitability use is thus taking a lower proportion of the total District II crop. However, the second highest utilization in terms of profitability is taking a slightly larger proportion as export percentages increase over the earlier postwar years. Thus, a difference between the districts that had seemed to be of some importance in the first decade of our period of observation is modified in the larger view of the entire period. It seemed evident in the shorter view that the central district might well benefit more from a relative shift to exports and away from the processed outlet to the extent that valencia exports are a more profitable outlet than products. However, the upward trend in southern district valencia exports in the more recent years have somewhat lessened this difference between district allocations.

In summarizing the structure of market outlets of the valencia crop, it seems true that the most profitable outlet--fresh shipments subject to regulation--has been taking a decreasing proportion of a decreasing southern district valencia crop, whereas this same channel has taken a widely fluctuating proportion of an increased average production in the central district.

TRENDS IN ORANGE SIZES AND SIZE DISTRIBUTION

Size as a Measurable Characteristic of Oranges Shipped Fresh

Size of the fruit is one of the characteristics of the orange crop affecting its price. Not only is average size important, but also the distribution of sizes from a given harvested crop is relevant. Size assumes this importance since consumers' attitudes and preferences, which influence consumer purchases, affect the prices received on the market. Consumers are not indifferent to sizes of oranges and are willing to pay premiums for certain sizes but will accept other sizes only with price inducement.

Fresh shippers generally price their oranges in terms of a size scale or size schedule which reflects experience in the premiums and discounts to move the various sizes shipped. In addition, there are legal requirements in California for citrus fruit acceptable for shipment. Responding to industry recommendations, matters such as size and maturity of fruit, container content, and related concerns are regulated by the State of California under the administration of the State Department of Agriculture, covered by legislative statute.^{1/} Fruit which is not shippable because of size is destined to products even if the fruit is acceptable in terms of other characteristics such as color, condition, sugar-acid ratio, and similar determinants of grade and quality.

Certain markets may prefer particular sizes or range of sizes, but generally there is a correlation between size and price--the larger the size, the higher the market price within the major segment of the size distribution. For that reason, an orange crop with "good sized fruit" brings growers and shippers higher returns than a crop with "small sized fruit."

For a host of reasons, including climatic influences and cultural practices, orange sizes are not stable between years. The variability may be large, and all of the reasons are not completely understood; even those which are understood are not always controllable. Thus, to a large degree the matter of size lies in the area of "natural factors."

^{1/} For specific regulations, see California, Agricultural Code (1965), Div. 5, c. 2, for most recent revisions covering citrus fruit and differing varieties, and biennial issues preceding.

In view of the importance of size, it is necessary to examine the extent to which consistent or systematic behavior does exist in the orange size patterns over a period of years. For this purpose, the navel and valencia crops will be considered separately in the central and southern producing districts during the postwar years to compare the size distribution within each harvest of fruit.

It should be noted, however, that the industry data available on orange sizes pertain to oranges shipped fresh under regulation. Data available on sizes actually harvested are sketchy and based on particular localities. Ideally, to obtain a complete picture of the size factor, information on sizes harvested as well as shipped fresh should be studied. But we must be content with size information on fresh shipments, being careful to recognize their limitations and not making inferences for which the data do not provide a sup-portable base.

Navels

A simple and convenient index measure of the size situation in a given crop year is the "average" size. In this sense, the average used is a weighted mean of the various sizes shipped, with the weights being the relative volumes in the respective sizes. Such average size measures are available for fresh shipments under regulation during a period of years.

Records show the average size of fresh navels shipped by the central and southern districts; for reference, these size data are shown in Table 27.^{1/}

^{1/} Size designations were somewhat changed in 1957, and these changes are incorporated in ibid. Sizes per box had been quoted through the 1955-56 season; 1955-56 and 1956-57 sizes per carton were quoted in one-half box rates. Then, in 1957 the current designations resulted in this alignment:

Current size of orange per carton	Prior size of orange per carton
40	no change
48	replaced 50
56	replaced 63
72	replaced 75
88	no change
100	dropped
113	replaced 110
138	replaced 126
163	replaced 144
180	replaced 172

TABLE 27

Navel Oranges: Weighted Mean Sizes
Central and Southern Districts

Crop year	Central	Southern
	average count per packed box	
1945-46	196	213
1946-47	196	214
1947-48	159	219
1948-49	218	255
1949-50	175	218
1950-51	185	195
1951-52	182	224
1952-53	186	222
1953-54	212	214
1954-55	186	223
1955-56	177	194
1956-57	192	193
	average count per packed cartons ^{a/}	
1957-58	94	95
1958-59	110	104
1959-60	110	108
1960-61	86	115
1961-62	90	114
1962-63	86	111
1963-64	108	130

^{a/} See footnote, page 57.

Source: See page 181.

The variability in navel sizes from year to year is evident from the table, although the revision of size designations and unit of measurement makes it more difficult to review the period as a whole. During the immediate postwar years, certain trend characteristics seemed to be developing. A size increase trend in southern navels was evident on which annual fluctuations were superimposed with somewhat larger sizes recorded in the mid-1950's. After the shifted designation, however, the size trend for southern navels seems to be in the opposite direction, a rather strange coincidence.

A more important observation for the earlier years was the smaller average navel sizes in the southern district as compared with the central district crop. This experience has continued throughout the period as a whole, with particularly striking differences in the short crop years in central navels. However, 1963-64 also recorded a very noticeable average size differential when both districts showed production increases. Therefore, on the basis of nearly 20 years' experience, southern district navel oranges seem to show average annual fresh shipment sizes that are generally smaller than those of the central district crop.

Size difference between navels of the two districts has not been stable over the years and, while southern navels trended in the mid-1950's toward larger navel orange sizes and central navel oranges maintained a flat trend, the size experience of the two districts narrowed to near equality for several years. However, the size differences have become wider again during the last four years, with variability evident in both districts.

Another way of looking at the average size of navels in the two districts is to consider a different type of average--the modal or peak size, the size which has a greater volume of fruit than any of the other sizes. This designation of size is not as meaningful as the weighted mean in terms of economic significance or as a factor bearing on returns. The peak size, however, is in a sense suggestive of the size characteristics of the fruit. For central and southern navels, separately, the peak sizes for fresh shipments are shown in Table 28.

This tabulation indicates clearly that the peak size of central navels is generally larger than that of southern navels. Under the old size definition, the two districts shared the same peak sizes only in 1950-51 and 1953-54.^{1/}

^{1/} For 1945-46 to 1957-58, see footnote on page 57 for details of changes in size classification.

TABLE 28

Navel Oranges: Peak Sizes, Central and Southern Districts

Crop year	Central	Southern
	size per packed box	
1945-46	176	220
1946-47	176	220
1947-48	150	220
1948-49	220	252
1949-50	150	220
1950-51	176	176
1951-52	150	220
1952-53	150, 176	220
1953-54	220	220
1954-55	176	252
1955-56	150	200
1956-57	176	200
	size per packed carton ^{a/}	
1957-58	88	88
1958-59	113	88
1949-60	113	113
1960-61	88	113
1961-62	88	113
1962-63	88	113
1963-64	113	113, 138

^{a/} See footnote, page 57.

Source: See page 181.

In general, the southern district did not have a peak size reflecting larger navels than did the central district. An exception to the district experience is observed in 1958-59 when the southern district peak was one size larger than that of the central district. This immediately followed the unusual crop year of 1957-58 when the peak size in the two districts was the same--an experience repeated in 1959-60, although the equal peak size that year (113) meant that the peak was a smaller sized fruit for both districts.

Whether a weighted mean or peak size measure is used, only one point on the size distribution is reflected. As a matter of fact, there are currently 9 (previously 10) regular sizes in which navels are packed for fresh shipment. This size distribution is reflected in the count per packed carton (40 through 180 and smaller). It is interesting to note that in the changes in classification made in 1957 slightly smaller orange size gradations were listed to replace the sizes above the middle range (88), and the size dropped was the midrange (100).

Since the bulk of the fruit is concentrated in a limited number of sizes which exclude the several largest and several smallest sizes, a meaningful way of comparing the size characteristics of the two districts is to use a measure of the middle 50 percent of the fruit. (This type of measure is often called the interquartile range.) Such a measure reflects the variation among sizes of a given crop--the extent to which a range of sizes is required to include the "middle 50 percent" of the annual volume shipped. In other words, the smaller sizes covering 25 percent of the volume and the larger sizes covering 25 percent of the volume are both excluded; the remainder constitutes the sizes covering the middle 50 percent of the fruit.

Such a measure of the size range covering the middle 50 percent of the central and southern navels is shown in Table 29. The size-range measures shown there are approximate in that splitting or interpolation between sizes is not shown; the change in definition of sizes is also indicated.

Until 1956-57, the middle 50-percent size range in the two districts was the same in three years. These were sizes ranging from 176 through 220.

In 1957-58, the size range was again the same--88's by the new carton size measures. During the other years, the middle 50-percent size range for central navels fell on larger sized oranges than on the range measured for southern navels.

TABLE 29

Navel Oranges: Size Ranges in Middle 50-Percent Quartile
Central and Southern Districts

Crop year	Central	Southern
	count per packed box	
1945-46	176, 200, 220	176, 200, 220
1946-47	176, 200, 220	176, 200, 220
1947-48	126, 150, 176	200, 220, 252
1948-49	200, 220	220, 252, 288
1949-50	150, 176, 200	176, 200, 220
1950-51	150, 176, 200	176, 200, 220
1951-52	150, 176, 200	200, 220, 252
1952-53	150, 176, 200	200, 220, 252
1953-54	200, 220	176, 200, 220, 252
1954-55	150, 176, 200	200, 220, 252
1955-56	150, 176, 200	176, 200, 220
1956-57	176, 200, 220	176, 200, 220
	count per packed carton ^{a/}	
1957-58	88	88
1958-59	113	88, 113
1959-60	113	88, 113
1960-61	72, 88	113
1961-62	88	113
1962-63	72, 88	88, 113
1963-64	113	113, 138

^{a/} See footnote, page 57.

Source: See page 181.

It is interesting to note that in the majority of cases, during the earlier period we are examining, the middle 50 percent spanned three sizes of navel oranges in both the central and southern districts.

In tabulating the years since 1957 after the slight changes in legal definition of the size classifications, it is immediately apparent that while the size trends within the two districts seem to follow more or less the same pattern the size range has been narrowed for the middle 50 percent of the crop. In five of the seven years, the midpoint rests in one size in the central district, and in three years the same is true of the southern district. District II during the other five years has a two-position midpoint, and in no case is there a three-size range.

However, before too much emphasis is placed on this observation and a generalization is drawn about changes in size designation, the detailed table of percentages must be reviewed for these years (see Table 30). It can be seen that the middle 50 percent is something of a euphemism. In many recent years, the navel orange crop has fallen into thirds in its size categories rather than falling into quartile divisions by size designations.

The overall generalization from the earlier years still holds true of this later period under careful scrutiny. Thus, the characteristics suggest a tendency for the variation or dispersion of navel sizes in the two districts not to differ much. But there is also a tendency for the central navel size distribution to include more of the larger sizes and fewer of the smaller sizes than is characteristic of the southern navels.

In observing separate size distributions for central and southern navels over the years, it can be said that the central navel distributions shifted toward the larger sizes compared to southern navel distributions during the postwar years. Exceptions, as in 1953-54 and 1956-57, are years when the weighted mean sizes of the two districts are just about equal.

In the more recent years, since the changes in size designation, the size composition of fresh shipments of navel oranges is shown in detail in Table 31. The years since 1957-58 are shown there in such a way as to indicate percentages of the entire crop by district which have fallen within each size category. For reference purposes, additional columns have been included showing the volume of the districts' fresh shipments for each year and the average mean size of navel oranges that particular year. If superimposed, the two districts seem roughly comparable in each year's size distribution, although

TABLE 30

Navel Oranges: Percentage Distribution Between Size-Range Quartiles
Central and Southern Districts

Crop year	Central			Southern		
	Larger	Middle 50 percent	Smaller	Larger	Middle 50 percent	Smaller
	percent					
1945-46	23.75	58.61	17.64	16.92	53.30	29.78
1946-47	24.17	58.62	17.21	17.92	52.01	30.07
1947-48	16.43	59.05	24.52	31.79	50.45	17.76
1948-49	27.70	41.38	30.92	25.29	58.44	16.27
1949-50	21.30	58.67	20.03	17.65	64.31	17.05
1950-51	33.20	42.41	24.39	22.53	62.17	15.30
1951-52	18.50	55.80	25.70	25.07	53.60	20.70
1952-53	18.50	51.70	29.80	27.40	53.20	19.40
1953-54	30.70	39.36	29.94	17.20	66.39	16.41
1954-55	15.34	55.98	28.68	21.72	59.58	18.70
1955-56	24.22	50.85	24.93	29.00	49.80	21.20
1956-57	30.52	49.90	19.58	31.31	46.46	22.21
1957-58	28.62	37.17	34.21	31.21	33.06	37.74
1958-59	39.24	34.54	26.22	18.70	58.07	23.23
1959-60	37.62	34.46	27.92	15.44	57.62	26.94
1960-61	15.44	61.90	22.66	37.20	28.00	34.80
1961-62	35.00	37.01	27.99	35.96	31.27	32.77
1962-63	16.84	59.99	23.17	16.78	52.26	30.96
1963-64	43.37	32.76	23.87	16.70	57.22	26.08

Source: See page 181.

TABLE 31

Navel Oranges: Size Composition of Fresh Shipments
Central and Southern Districts, 1957-1964

Crop year	Total volume	Sizes, central district									Average mean
		40 and larger	48	56	72	88	113	138	163	180 and smaller	
	carloads	percent									
1957-58	11,722	0.29	0.76	6.84	20.73	37.17	23.91	7.31	2.33	0.66	94
1958-59	17,476	0.06	0.17	2.13	8.35	28.53	34.54	18.10	7.75	0.37	110
1959-60	13,297	0.13	0.25	2.59	8.54	26.11	34.46	19.70	8.15	0.07	110
1960-61	7,887	1.06	1.83	12.55	27.09	34.81	16.70	4.55	1.10	0.31	86
1961-62	5,424	0.96	1.28	9.10	23.66	37.01	19.26	5.80	1.80	1.13	90
1962-63	9,253	1.52	2.32	13.00	26.92	33.07	16.76	4.58	1.28	0.55	86
1963-64	15,801	0.08	0.20	2.42	10.07	30.60	32.76	16.08	6.50	1.29	108
		Sizes, southern district									
1957-58	5,240	0.56	1.27	8.44	20.94	33.06	22.49	8.88	3.05	1.32	95
1958-59	11,237	0.50	0.87	4.84	12.49	29.36	28.71	16.01	7.21	0.01	104
1959-60	7,545	0.28	0.57	4.11	10.48	27.89	29.73	18.42	7.92	0.60	108
1960-61	7,508	0.23	0.41	3.15	8.59	24.82	28.00	18.30	8.69	7.81	115
1961-62	7,008	0.15	0.28	2.39	7.88	25.26	31.27	20.34	7.24	5.19	114
1962-63	7,194	0.50	0.77	4.50	11.01	25.01	27.25	17.07	7.46	6.43	111
1963-64	7,415	0.01	0.05	0.60	2.78	13.26	28.53	28.69	16.94	9.14	130

Source: See page 181.

the southern district shows higher percentages of smaller size ranges extending over most of the years.

Again, the major conclusions reached by other methods of size measurement are reinforced by these observations; there is little essential difference between the two districts over time. What was indicated in the earlier post-war years as a shift in direction toward the larger size for central navel oranges was not as true during the latter half of the 1950's. The years that seemed exceptions in the 1950's seem now to have been indications of an "equalizing" tendency, particularly noticeable between 1956-57 and the short crop years in the central district. It is possible that the shift in size designations may have emphasized this tendency.

The navel oranges of the smaller available crop in District I in the early 1960's were larger in size; thus, generalizations are still tentative about the last four years' experience. However, it is equally possible that the smaller sizes indicated in District II for 1963-64 are also an exception. Therefore, it is reasonable at this point in time to suggest that the major conclusion reached by other methods of size measurement still holds true. There is a relatively small size difference, or difference in size distribution, that can be measured in navel oranges which slightly benefits the central district.

The importance of this detailed and specific review of orange sizes by district is this: When somewhat larger sized navel oranges are recorded for District I in somewhat larger proportion than for District II, this might indicate a slight economic advantage if price differentials result directly from fresh shipments of larger sizes.

Valencias

A study of size patterns in valencia oranges in the two districts reveals the same tendency to slightly larger sizes in the central district oranges. It is generally true that valencia oranges tend toward smaller sizes than do navels. But here we are not concerned with a comparison of navel and valencia sizes. Our interest is in the differential size behavior of southern and central valencias. Hence, we shall review the size developments in the valencias of the two districts as was previously done for navels.

As a first approach to the valencia sizes in the two districts, we review the weighted mean sizes of fresh shipments under regulation during the postwar years (see Table 32).

No size data for central valencias are available for 1948-49 and 1949-50 because of the bad frost situations in those years. In the southern district also, as is evident from the above data, 1948-49 was a bad size year because of frost effects.

It is clear that, aside from 1948-49, the southern valencia mean size of fresh shipments tended toward larger fruit during the postwar years through 1953-54. Thereafter, there was some return toward smaller sizes. A somewhat different picture emerges for central valencias; no trend appears in the postwar years until the mid-1950's when several years indicate increases to larger sizes. A rough tendency toward a narrowing of the size differential between southern and central valencias is a first observation. This reflects the general upward trend in southern valencia sizes in combination with the relatively flat trend in central valencia sizes.

The year-to-year variability in valencia sizes and the abruptness with which trends change make any detailed generalizations about the annual weighted mean sizes of valencias difficult. Central valencias did average a smaller count per packed box during the first postwar decade than the southern district valencias, which means somewhat larger oranges shipped from the central district. Since 1957-58, the fluctuations in average mean size of fresh shipments have been equally noticeable in both districts. In five of the last seven years shown, the central district has shown larger average size oranges than the southern district. The size differences are not great enough, however, to be of much significance over the period as a whole.

Another way of viewing the tendency toward size differentials between the southern and central valencias is to compare their peak sizes (see Table 33).

In most postwar years, the peak size of central valencias was larger than that of the southern valencias. Southern valencias, however, showed size improvement over the earlier postwar years. In both of the districts a marked shift toward small peak sizes occurred in 1955-56.

In the second decade, the major observation is the stability of the peak size in the central district throughout the last six years. The southern district also shows only two peak sizes throughout this period, although the peak was in a smaller orange size in two of the years and close to a peak in

TABLE 32
Valencia Oranges: Weighted Mean Sizes
Central and Southern Districts

Crop year	Central average count per packed box	Southern average count per packed box
1945-46	219	287
1946-47	239	265
1947-48	228	277
1948-49	a/	327
1949-50		275
1950-51	228	247
1951-52	233	245
1952-53	233	241
1953-54	223	228
1954-55	212	235
1955-56	213	250
1956-57	206	236
	average count per packed carton ^{b/}	
1957-58	104	117
1958-59	120	115
1959-60	114	127
1960-61	121	130
1961-62	109	125
1962-63	117	125
1963-64	127	158

a/ Blanks indicate bad frost years when no data were recorded.

b/ See footnote, page 57.

Source: See page 181.

TABLE 33
Valencia Oranges: Peak Sizes
Central and Southern
Districts

Crop year	Central	Southern
	average count per packed box	
1945-46	220	344 and smaller
1946-47	252	288
1947-48	252	344
1948-49	a/	344
1949-50		344
1950-51	220	252
1951-52	220	252
1952-53	252, 220	252
1953-54	220	252
1954-55	200, 220	252
1955-56	252	288
1956-57	176	226
	average count per carton ^{b/}	
1957-58	88	113
1958-59	113	113
1959-60	113	113, 138
1960-61	113	138
1961-62	113	113
1962-63	113	113
1963-64	113	138

a/ Blanks indicate bad frost years when no data were recorded.

b/ See footnote, page 57.

Source: See page 181.

a third. A rough approximation to the earlier years indicates that the stability of sizes noted in both districts probably represents a smaller sized orange throughout these more recent years.

These peak-size data roughly follow those reflecting the weighted mean sizes. The latter measures are more meaningful, since they are influenced by the distribution of sizes in a given crop rather than reflecting a single size as the peak one. A further indication of the comparative size distributions of valencias in the southern and central districts is shown in Table 34.

For the first postwar years, the middle 50-percent size range in central valencias included at least three size classifications for all but one year, indicating an interquartile range spread over a larger proportion of the crop. This was true in only about one-half of the first postwar decade for the southern district, indicating more of a concentration around the sizes in the middle 50-percent range in the valencia crop there. However, upon inspection, the wider range in central valencias tended in general to the larger sizes.

In the years since 1956-57, a slightly different experience has been recorded--one which may have been intensified by the change in designations. Here, the middle 50-percent size range in the central district has been concentrated in one category in all but two of the eight years noted, while the southern district has shown at least two size dimensions in the middle 50 percent in all but two years. It should be noted, however, that the central district size distributions did not divide well into quartiles in this second period, and a crop divided into thirds was more characteristic of size distributions. The southern district in the last few years has had closer to a rough division of percentages in the lower 25 percent and upper 25 percent range, leaving approximately a middle 50 percent of some meaning (see Table 35).

By further comparison, it is clear that the southern district oranges tended, as in the earlier decade, to be of smaller size than those in the central district. The middle 50-percent classification, which ranged over two sizes in the southern district, included a size count of smaller oranges than the central valencias in every year but one since 1957-58. In 1963-64, as this study is concluded, the size count for the middle 50 percent is the same for both districts.

The data on the size ranges including 50 percent of the fresh shipments regulated, in conjunction with annual weighted mean sizes, describe major characteristics of the southern and central valencia distribution of sizes.

TABLE 34

Valencia Oranges: Size Ranges in Middle 50-Percent Quartile
Central and Southern Districts

Crop year	Central	Southern
	count per packed box	
1945-46	200, 220	252, 288
1946-47	200, 220, 252	200, 252, 288
1947-48	200, 220, 252	252, 288
1948-49	a/	288
1949-50		220, 252, 288
1950-51	200, 220, 252	220, 252
1951-52	200, 220, 252	220, 252
1952-53	200, 220, 252	220, 252
1953-54	200, 220, 252	200, 220, 252
1954-55	176, 200, 220	220, 252
1955-56	176, 200, 220, 252	220, 252
	count per packed carton ^{b/}	
1956-57	88, 113	113, 138
1957-58	113	113
1958-59	113	113, 138
1959-60	113	113, 138
1960-61	113	113, 138
1961-62	113	113, 138
1962-63	113	113, 138
1963-64	113, 138	113, 138

a/ Blanks indicate bad frost years when no data were recorded.

b/ See footnote, page 57.

Source: See page 181.

TABLE 35

Valencia Oranges: Percentage Distribution Between Size-Range Quartiles
Central and Southern Districts

Crop year	Central			Southern		
	Larger	Middle 50 percent	Smaller	Larger	Middle 50 percent	Smaller
1945-46	27.28	41.52	31.20	25.74	44.45	29.81
1946-47	18.21	59.79	25.62	20.84	59.79	19.37
1947-48	27.49	50.84	21.67	29.45	45.87	24.68
1948-49	a/			27.20	24.07	48.73 ^{b/}
1949-50				18.92	56.38	24.70
1950-51	27.25	51.61	21.14	31.11	39.87	29.02
1951-52	18.80	56.60	24.60	23.50	45.80	30.70
1952-53	19.10	57.30	23.60	26.40	45.20	28.40
1953-54	25.57	56.13	18.30	24.44	51.97	23.59
1954-55	15.82	54.45	29.73	27.93	48.60	23.47
1955-56	23.01	57.79	19.20	17.23	44.72	38.05
1956-57	19.09	60.36	20.55	27.08	58.86	14.06
1957-58	49.52	33.54	16.94	31.99	53.49	14.52
1958-59	21.69	36.65	41.66	31.30	34.55	30.72
1959-60	33.95	34.39	31.66	20.33	56.53	23.14
1960-61	25.22	35.17	39.61	13.33	64.68	21.99
1961-62	41.88	35.27	22.85	22.19	57.15	20.66
1962-63	30.31	35.01	34.68	20.87	59.41	19.72
1963-64	17.71	61.43	20.86	11.01	57.97	31.02

a/ Blanks indicate bad frost years when no data were recorded.

b/ Because of the frost year, this larger percentage was in size 344 and smaller.

Source: See page 181.

A full description, however, would show the complete size distributions of each crop year.

For both the southern and central districts, the size distributions in most years follow a pattern which reflects a general preponderance of the smaller size fruit (as a percent of fresh shipments), with this tendency being somewhat greater for southern than central valencias. This, in combination with the position of the size distributions, accounts for the general tendency, with some exceptions, toward larger average sizes in the central than in the southern district. But as the weighted mean size data have indicated, a survey of the complete size distribution reflects no persistent and systematic relationship prevailing among size distributions of the southern and central valencias shipped fresh.

In Table 36 the size detail is brought up to date with the new size classifications showing count per packed carton in the 9 rather than the 10 categories. Again, as in the section on navel oranges, total volume of shipments as well as average size has been included in the table to allow perspective for the two districts. In this way the continuing tendency for central district oranges to be somewhat larger in size is noted, but the distribution of the crop into the various sizes in the two districts does not admit of any meaningful generalization of experience in the relationship between the two districts.

One additional word on size distribution of oranges shipped fresh in California: The sizes adopted in 1956-57, which are quoted on a per-carton rather than a per-box basis, are approximately the same in the larger sizes but include additional and slightly different smaller sizes per carton than were specified in the per-box notations. It will remain to be seen in the future whether this "de facto" recognition of the preponderance of smaller size fruit was necessary or whether the size distribution will run to the larger fruit as continual technical experimentation with the causes of "under-size" fruit becomes more successful.

Other Characteristics of Southern and Central Oranges

In consideration of the physical characteristics of oranges, attention is usually directed to the size factor. This is so not only because size is of concern to buyers but also because size affects price and returns to shippers.

TABLE 36

Valencia Oranges: Size Composition of Fresh Shipments
Central and Southern Districts, 1957-1964

Crop year	Total volume	Sizes, central district									Average mean
		40 and larger	48	56	72	88	113	138	163	108 and smaller	
	carloads	percent									
1957-58	4,298	.02	.15	2.24	10.82	36.29	33.54	11.87	3.72	1.35	104
1958-59	4,490	.01	.03	0.65	3.17	17.83	36.65	29.01	12.43	0.22	120
1959-60	4,186	.08	.20	2.36	7.30	24.01	34.39	20.75	8.00	2.91	114
1960-61	2,396	.01	.05	0.86	4.00	20.30	35.17	23.81	9.35	6.45	121
1961-62	1,835	.03	.10	1.56	7.77	32.42	35.27	15.38	5.04	2.43	109
1962-63	2,013	.08	.24	1.73	5.84	22.42	35.01	21.72	8.00	4.96	117
1963-64	5,519	a/	.03	0.40	2.62	14.66	32.59	28.84	13.29	7.57	127
		Sizes, southern district									
1957-58	16,698	.01	.07	1.09	6.12	24.70	32.78	20.71	9.51	5.01	117
1958-59	21,950	.01	.09	1.27	5.60	24.33	34.55	24.14	9.95	0.06	115
1959-60	14,543	.02	.09	0.92	3.49	15.81	28.18	28.35	16.78	6.36	127
1960-61	15,002		.03	0.31	1.42	11.57	31.74	32.94	14.54	7.45	130
1961-62	11,640	.02	.09	1.03	3.80	17.25	30.83	26.32	12.06	8.60	125
1962-63	12,754		.04	0.62	3.18	17.03	32.90	26.51	11.95	7.77	125
1963-64	10,386		.03	0.35	1.51	9.12	25.87	32.10	20.31	10.71	158

a/ Blanks indicate none in this size classification.

Source: See page 181.

Size, however, can be considered in detail because over the years marketing agencies have issued data on the size distributions of fresh shipments. The availability of such data encourages their use and makes it possible to articulate the differing size developments by district and variety.

Size, however, is only one of the physical characteristics of oranges; others include color, juice content, sugar-acid ratio, skin condition, and aroma and flavor ratings. Such characteristics also affect the demand for and prices of oranges. In a complete comparison of the differential characteristics of southern and central oranges, those other characteristics would have to be included. Such, however, cannot be done meaningfully because appropriate actual data are not at hand and to our knowledge are not available. Opinions from observers and those close to the trade may be considered, but they reflect conflicting viewpoints and experience. The separate characteristics and their interactions apparently reflect subtle and complicated relationships which are not easily and readily apparent in the same way to all observers. Without factual data on the various characteristics, in addition to size, a meaningful disentangling of the extent and frequency of the differing characteristics of southern and central oranges cannot be made.

Different from but possibly related somehow to the physical characteristics of the oranges is their keepability after shipment or their maintenance of market condition. There are contrasting opinions as to whether southern and central oranges generally have different degrees of keepability. But here again, no data are available from which to ascertain the facts. It may well be that some variety from a given district has a lesser keepability than the same variety from another district. Yet we cannot say anything substantive about such matters because we have no way of knowing the facts.

The same type of problem exists in the holding of the fruit on the trees. It is often asserted that southern district oranges are more prone to be subject to windfall and other types of tree loss. Some scattered data are available for tree losses in the southern district, but comparative data for the central district are not available. Perhaps the incidence of such loss in the central district has not been sufficient to make it meaningful to collect data. At the present time, however, one cannot make supportable statements one way or the other about the relative degrees of tree loss in the central and southern districts. Thus other physical characteristics and influences,

except size, remain an unknown factor in terms of comparing the district and variety differential trends.

In a much more detailed study of growth patterns of citrus fruit in the southern and central districts, other data could be gathered on weather conditions (including maximum and minimum temperatures), incidence of damaging winds, leaf drops, soil conditions, insect and disease prevalence, fertilization requirements, irrigation needs, etc. Such studies are continually being made by various public as well as private agencies in specific areas with a view to improving cultural practices in citrus orchard management. To this date, however, no comparative studies of the two districts we are considering are readily available; therefore, this area remains open to further controlled experiment and study.

LENGTH, PATTERN, AND OVERLAPPING OF DISTRICT SHIPMENTS

This study was developed to provide basic data for those concerned with the California-Arizona orange industry under marketing order experience based on particular prorate districts and influences of the marketing order administrative committees. In the previous sections of this report, the analysis was presented in terms of the comparative situations in the central and southern orange producing districts. Also, a four-way distinction was made between the navel and valencia varieties of oranges in each of the two districts: central navels, southern navels, central valencias, and southern valencias. In terms of production and in some marketing aspects, each of those four categories of oranges comprises a different "commodity." From the view of consumer demand, there may be near perfect substitution or at least a high degree of substitution between central and southern navels and between central and southern valencias. But from the view of supplies and shipments, there are important differences between the same variety in the two districts.

Because of differences (soil, water, climate, and other conditions affecting orange growing) in the geographical location of the southern and central districts, different crops result from the view of harvesting and market shipping. Aside from the distribution of sizes of the fruit in the central and southern districts, it is a moot question whether the oranges differ in other respects which are important to consumers. But what is clear is that the harvest-shipment periods of the two districts are distinctively different. Since their shipment periods differ and, to some extent at least, their duration has been affected by regulation through the federal marketing agreement orders, it is pertinent to consider the lengths of the shipping seasons of the two varieties in the two districts.

Length of Shipping Seasons

There are various ways of measuring and comparing characteristics of the shipping seasons. One way is to consider the number of weeks during which shipments have been made within a given marketing year (November through October). Another way, which is more acceptable from the view of economic impact on growers and shippers, is to consider the number of weeks involved in the full shipping season--from the time shipments of a variety in a given

district begin until they are completed. Such comparisons for navels from the central and southern districts may be made from Tables 37 and 38 which include the postwar years beginning with 1945-46.

When the central navel shipping season data are examined, it is evident that no real change has developed in the timing of initial shipments. The beginning week varies from about the beginning of November to about the third week of that month. No marked change has been introduced in the timing of initial central navel shipments which are somewhat tied to the maturing of the fruit and its condition and availability for shipment.

The timing of the end of the central navel shipping season, however, has shown more variation over the years. For nine years after 1945-46 the end of the central navel shipping season fell in March or April, with a single year's exception. Thereafter, the season fluctuated and extended further for several years, lasting for as long as July in 1956-57. In the past several years, however, the earlier pattern has seemed more characteristic. The market data do indicate that varying lengths of shipping seasons have been recorded, but it is not at all clear that any trends of change have developed. For a few years in the mid-1950's, central navels were shipped over a period of 30 weeks and longer; but in recent years there has been a return to the 20-25 week range, although it is true that this is a slightly longer average shipping season than was experienced right after World War II.

What, in the meantime, has been occurring in the southern navel shipping period? Some indication is suggested in the data summarized in Table 38. As in the central navels, no systematic shifting in the beginning of navel shipments from the southern district is evident. The first week of southern navel shipments during the postwar years has varied from the middle of November to the middle of December, with late November and early December as the norm. The end of the southern district navel shipping period varied slightly through 1956-57, with the usual terminal date in the latter part of June. In one year of the first decade, shipments continued into July. Since 1957, however, the tendency has shifted toward a somewhat earlier date for final shipments from the southern district, with a May terminal date in six out of the last seven years.

The tendency to a slightly shorter southern navel season is also noticeable. During the first postwar decade, southern district navels were shipped over a period averaging close to 30 weeks. After the short season recorded in

TABLE 37
Navel Production: Seasons for Fresh Shipping
Central District

Crop year	Beginning week of season ^{a/}	Ending week of season ^{a/}	Number of weeks
1945-46	November 17	March 16	18
1946-47	November 9	April 12	23
1947-48	November 8	March 27	21
1948-49	November 20	March 12	17
1949-50	November 12	April 8	22
1950-51	November 18	March 31	20
1951-52 ^{b/}	November 17	April 5	21
1952-53 ^{b/}	November 15	May 23	28
1953-54	November 22	April 11	21
1954-55	November 7	May 8	27
1955-56	November 20	June 10	30
1956-57	November 11	July 7	35
1957-58	November 3	May 4	27
1958-59	November 9	May 31	30
1959-60	November 1	April 24	26
1960-61	November 6	March 26	21
1961-62	November 12	March 25	20
1962-63	November 11	April 28	25
1963-64	November 9	April 26	25

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

^{b/} Estimated by authors from trade data for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

TABLE 38
Navel Production: Seasons for Fresh Shipping
Southern District

Crop year	Beginning week of season ^{a/}	Ending week of season ^{a/}	Number of weeks
1945-46	December 1	May 25	26
1946-47	November 30	May 31	27
1947-48	December 6	June 26	30
1948-49	November 13	May 21	28
1949-50	December 10	July 8	31
1950-51	December 9	June 16	28
1951-52 ^{b/}	December 15	June 14	27
1952-53 ^{b/}	December 13	June 20	28
1953-54	December 6	June 13	28
1954-55	November 21	June 26	32
1955-56	December 11	July 1	30
1956-57	December 2	July 7	32
1957-58	December 8	May 11	23
1958-59	November 30	May 31	27
1959-60	November 15	May 15	27
1960-61	November 13	May 14	27
1961-62	November 19	May 6	25
1962-63	November 25	June 2	28
1963-64	November 24	May 24	27

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

^{b/} Estimated by authors from trade data for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

1957-58 (23 weeks), the southern district has never returned to the longer season but has averaged closer to 27 weeks during which fresh navel oranges are shipped from District II. Thus, the market data suggest that rather than the variation recorded by the central district shipments, with only slight indications in more recent years of an average tendency to lengthen somewhat, the southern district season is more clearly averaging fewer weeks of recorded shipments during the more recent years.

Next, attention is directed to what has been happening in the lengthening of the valencia shipping periods. Again, the central and southern districts are considered separately so their similarities and differences may be delineated and classified (see Tables 39 and 40).

When the beginning weeks of shipment of central valencias are examined, it is found that there has been little change during the postwar years. Central valencia shipments generally begin toward the end of March or early in April. The only notable exception was 1962-63 when central valencias did not move until the week ending April 21.

The data in the tables, however, do reflect considerable variation in the end of the central valencia shipping season. There is little that can be delineated as a trend since there has been fluctuation throughout the entire period. Nevertheless, there is a noticeable shift beginning with 1954 (the 1953-54 season) when the central district valencias were shipped into the late fall and early winter for several years. Even 1955-56, which appears as a fore-shortened season, actually shipped two carload of valencias in November, thus technically extending the shipping season that long. This occurred again in 1960-61 when one carload was shipped in November after a 13-week intermission in central district shipments. However, the intervening years showed many in which July and August were the usual months for termination of shipments.

If the season is identified by the number of weeks of more or less consecutive shipments, omitting the two exceptions noted above, it is quite noticeable that the period after 1953-54 (when the current valencia federal marketing order prorated shipping program was introduced) initiated a lengthened shipping season which continued for several years. However, fluctuations toward shorter seasons and short crop years since 1957 have made any generalizations about lengthened season quite tentative. For example, in 1962-63 central valencias were shipped for 15 weeks, but in 1963-64 there were 28 weeks during which District I shipped valencias under regulation.

TABLE 39

Valencia Production: Seasons for Fresh Shipping
Central District

Crop year	Beginning week of season ^{a/}	Ending week of season ^{a/}	Number of weeks
1945-46	April 6	June 22	12
1946-47	April 5	October 18	29
1947-48	April 10	October 9	27
1948-49	April 16	July 2	12
1949-50	April 1	August 12	20
1950-51	April 14	July 7	13
1951-52 ^{b/}	March 29	June 21	13
1952-53 ^{b/}	March 28	July 18	17
1953-54	April 4	November 14	33
1954-55	April 2	December 4	36
1955-56	March 25	July 15	17 ^{c/}
1956-57	March 31	November 17	34
1957-58	March 16	August 10	22
1958-59	March 22	August 23	23
1959-60	March 20	November 6	34
1960-61	March 19	July 30	20 ^{d/}
1961-62	April 1	August 12	20
1962-63	April 21	July 28	15
1963-64	March 29	October 4	28

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

^{b/} Estimated by authors from trade data for the two years when a fresh shipping marketing order was not operating.

^{c/} Two carloads shipped week ending November 11 after 17-week inter-mission.

^{d/} One carload shipped week ending November 5 after 13-week inter-mission.

Source: See page 181.

TABLE 40

Valencia Production: Seasons for Fresh Shipping
Southern District

Crop year	Beginning week of season ^{a/}	Ending week of season ^{a/}	Number of weeks
1945-46	April 20	November 30	33
1946-47	March 29	December 27	40
1947-48	May 1	December 18	34
1948-49	April 30	December 24	35
1949-50	May 13	December 23	33
1950-51	May 5	January 27	39 ^{b/}
1951-52 ^{c/}	April 19	January 31	42
1952-53 ^{c/}	May 2	December 20	34
1953-54	April 11	December 5	35
1954-55	April 3	January 1	40
1955-56	April 22	December 16	35
1956-57	March 31	December 15	38
1957-58	March 23	November 30	37
1958-59	March 15	December 6	39
1959-60	March 20	December 25	41
1960-61	March 19	January 7	43
1961-62	March 25	December 23	40
1962-63	March 31	December 29	40
1963-64	April 19	December 6	34

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

^{b/} Termination of federal marketing order left no data available on end of shipping season. Number of weeks is therefore estimated by authors from trade data.

^{c/} Estimated by authors from trade data for the two years when a fresh shipping marketing order was not operating.

Source: See page 181.

Although the southern valencia shipping season reflects no systematic lengthening or shortening, the volume shipped has been substantially decreasing throughout the period. Hence, there has been a tendency for lower average weekly shipments of southern valencias, reflecting lower seasonal total volume with no persistent change in the length of season. For central valencias for several of the mid-1950 years there was a tendency toward smaller average weekly shipments, reflecting a lengthened shipping season in conjunction with seasonal total shipments not much different in level from immediate postwar years. However, since the late 1950's the length of season measured in weeks has not been increasing and the volume of fresh shipments has fluctuated considerably, so this generalization can no longer be made for the period as a whole. The most that can be said currently for district difference in this regard is that, despite differences in volume in the two districts and despite differences in production volume over the years, the length of season measured in weeks of fresh shipments under regulation in each district has not shown any particular pattern of change.

Within-Season Distribution of Shipments

Consideration of the interdistrict shipping relationships may be further approached by comparing the within-season distribution of shipments in the central and southern districts (Table 41). They are now examined from the view of the differing shipping patterns of the two districts, with navels and valencias again reviewed separately. The columns in the table show the number of weeks elapsed since shipments began and until 10, 25, 50, 75, 90, and 100 percent of the shipments were completed. The left set of columns is for central navel shipments; the right set of columns shows southern district navel shipments. The weeks shown are cumulative--that is, each percentage category includes all weeks from the beginning of the season and shows the number of weeks of fresh shipments that had taken place before a given percentage of the total volume of fresh shipments had been shipped under regulation from each district.

Observation indicates that variations in within-season distribution which had been characteristic of the earlier years in the central district seem to have been "regularized" to a much more "set" pattern in the later years. This is certainly true of the number of weeks into the season for 10 and 25 percent

TABLE 41

Navel Oranges: Fresh Shipments, Distribution Within and Length of Season, by District

Crop year	Central						Southern					
	Percentages ^{a/}											
	10	25	50	75	90	100	10	25	50	75	90	100
	weeks ^{b/}											
1945-46	1	2	4	6	8	18	6	9	13	17	21	26
1946-47	3	4	6	10	12	23	8	12	16	19	21	27
1947-48	2	3	5	9	11	21	7	11	15	19	21	30
1948-49	2	2	4	6	8	17	7	10	14	17	20	28
1949-50	2	3	4	7	9	22	8	11	15	19	22	31
1950-51	2	3	6	9	11	20	8	11	15	19	21	28
1951-52	2	3	5	8	10	21	7	9	12	16	19	27
1952-53	3	4	7	10	13	28	8	11	15	19	21	28
1953-54	2	3	7	11	14	21	9	12	16	19	22	28
1954-55	3	5	9	13	18	27	11	14	18	21	24	32
1955-56	3	6	11	16	21	30	9	12	16	20	23	30
1956-57	3	4	9	14	19	35	10	14	18	22	24	32
1957-58	3	5	10	15	18	27	5	8	12	16	18	23
1958-59	3	6	12	17	21	30	8	12	16	19	21	27
1959-60	3	6	10	15	18	26	7	11	15	19	21	27
1960-61	3	5	7	12	15	21	8	12	16	19	21	27
1961-62	3	4	7	10	14	20	8	11	15	18	20	25
1962-63	3	4	6	10	12	25	8	12	16	19	21	28
1963-64	3	5	10	15	18	25	8	11	15	19	21	27

^{a/} Each percentage category includes all weeks from beginning of season.^{b/} Number of weeks preceding the indicated percentage of total shipments for year.

Source: Developed by the authors from sources listed on page 181.

of the total fresh navel crop volume to have been shipped. In every year since 1956-57, 10 percent of the crop has been shipped before three weeks of the season has passed. At the most, three more weeks see the shipment of 25 percent of all volume for the year. There is slightly more variation through the 50 percent range but, in general, the interval is nearly the same every year between each of the divisions until the last 10 percent is reached. Here, it is only reasonable to note that annual seasonal variations will be most evident. And it is here that changes can be observed which are reflected in the length of the shipping season. There has been a tendency for the tail-end shipments of central navels--the last 10 percent--to stretch out after 1954, and for several years it seemed there might be an overall tendency in this direction. However, variation in shipping the last 10 percent of the central district crop during the years since 1957 indicates that there is no lasting trend to lengthen the period over which shipments are made more than had been characteristic of the district shipments before 1952. In other words, any slight tendency toward a longer shipping season in general which may have been noted in the central district has not been concentrated in any single segment of the season but has been distributed within the season. Furthermore, trends which seemed to be developing during the five years from 1953 through 1957 seem not to have been lasting changes in the within-season distribution pattern.

When the pattern for southern navels is examined, no distinctive or systematic developments are apparent. Aside from the slight tendency for the southern navel shipping season as a whole to average a week or so longer during the mid-1950's--a tendency which is not sufficiently pronounced to be significant--only one other tendency is noticeable--also a minor one and possibly not significant--that is, an elongation of the first 10 percent of the southern navel shipping period for the years since 1954. But in overall terms, the market record presents no evidence for a marked or systematic change developing in the within-season distribution of southern navel shipments. Substantial stability has prevailed in the within-season distribution of southern navels, which contrasts with the situation noted above for central navels. In fact, the major difference to be remarked between the two districts in pattern of within-season distribution of navel fresh shipments, in addition to changes over time within each district, is the continuity of pattern within the southern district where the shipments, clearly established over a somewhat longer period of time, have remained almost fixed throughout nearly 20 years and have

been subjected to very little fluctuation despite any other change. The central district, possibly because of newer plantings and conceivably considerations involving transportation, has had more variation, though even there the pattern has been remarkably stable.

In reviewing the same data for valencia fresh shipments under regulation--observing the two districts separately and comparing experience over time--the same illustrative method has been used as was developed for navel shipments (see Table 42).

When the within-season patterns of shipment distribution of valencias are considered, further contrasts between the southern and central districts are noted. For southern valencias there appeared in the years immediately after 1954 a tendency toward some stretching of the time taken to complete the first 10 percent of shipments compared with the average tendency in most of the years prior to 1953-54. On the other hand, the number of weeks used to ship the last 10 percent of southern valencias since 1952-53 tends to be less than in the earlier years. Yet, there does not appear to be a persistent and increasing tendency for elongation of the early and late shipments of southern valencias. The difference seems to be between the early and later periods divided by 1953-54, and the contrast is not a strong one for in the three most recent years the first 10 percent has again been shipped in fewer weeks.

There is more indication of change in the within-season distribution of central valencias. When the early shipments are compared--the first 10 or 25 percent--no persistent or strong shift is evident; but when the late shipments are examined, particularly the last 10 percent of the season, a sharp break is evident beginning with 1953-54. A definitely marked elongation of the time period taken to ship the final 10 percent of central valencias was prevalent after 1953-54 through the rest of the 1950's compared with the situation in prior years. There was also a slight tendency--not a significant one--for a lengthening of the period to include 75 percent of the shipments. However, when the experience of the last five years is compared with the years immediately after 1953-54, it can be seen that the tendency to elongate the last 10 percent of shipments was relatively temporary and, although there is still marked variation, the general trend has seemed to be comparable to the earlier years once more.

For both varieties in the central district, some changes in the within-season distribution of shipments as well as the tendency toward lengthening of

TABLE 42

Valencia Oranges: Fresh Shipments, Distribution Within and Length of Season, by District

Crop year	Central						Southern					
	Percentages ^{a/}											
	10	25	50	75	90	100	10	25	50	75	90	100
	weeks ^{b/}											
1945-46	2	4	5	6	6	12	6	9	15	20	24	33
1946-47	4	5	6	8	10	29	11	15	21	27	30	40
1947-48	4	5	6	8	10	27	6	10	15	21	24	34
1948-49	3	3	5	6	7	12	6	10	16	22	25	35
1949-50	5	6	7	8	9	20	4	8	13	18	22	33
1950-51	3	4	5	6	7	13	5	9	16	21	25	39
1951-52	2	3	4	6	7	13	6	10	16	22	26	42
1952-53	3	5	7	9	10	17	6	9	15	21	25	34
1953-54	4	5	7	8	10	33	9	13	19	24	28	35
1954-55	4	6	8	10	12	36	10	14	20	27	30	40
1955-56	4	6	7	9	10	17	7	11	17	23	27	35
1956-57	5	7	9	12	15	34	10	14	20	26	29	38
1957-58	4	5	7	9	11	22	9	13	18	25	29	37
1958-59	5	7	8	10	12	23	10	15	22	28	31	39
1959-60	3	5	7	9	11	34	9	14	20	27	30	41
1960-61	4	5	7	8	10	20	10	14	22	28	32	43
1961-62	3	4	5	8	10	20	8	13	20	27	31	40
1962-63	2	3	4	5	7	15	9	13	19	26	29	40
1963-64	3	5	7	9	12	28	6	11	17	22	26	34

^{a/} Each percentage category includes all weeks from beginning of season.^{b/} Number of weeks preceding the indicated percentage of total shipments for year.

Source: Developed by the authors from sources listed on page 181.

the marketing period apparently occurred after 1952-53. The initiation of the current marketing agreement order prorated, with separate programs for navels and valencias, seemed to introduce changes in the structure of the seasonal pattern of shipments and seasonal length. With a full decade of observation since there were federal orders on which to rely, it now seems that changes in structure and length of season, which seemed to be relatively strong shifts over the first five years, have now been modified or "smoothed" so that there is less marked contrast noted, although several minor changes still remain. It may well be that the length of time has assisted in this modification in large part because it has included of necessity several short crop years in the central district which, while recognized as exceptions, still may affect the whole structure of the industry. In addition, the combination of shifts in volume of production in both varieties and both districts over the longer period of time may also be influential in modifying any major changes that might have been developing. Nonetheless, it may still be true, despite the general observations already made, that the changing pattern of production of the two varieties in the two districts in conjunction with the operation of the separate regulated shipments for the navel and valencia varieties did account for the changed pattern of shipments and season lengths which were observed for several years and may be observed again with another space of time and experience since prorated districts are still operative, with only minor changes in their boundaries.

Another view of the broad changes which have occurred in the within-season shipment patterns is shown by the cumulative distribution of shipments over the entire season for each district and each variety. By three-week intervals, the cumulative percentages of seasonal total shipments are tabulated with four-year averages shown for 1953-1957 and 1957-1961, and a three-year average figure for the most recent period (see Table 43).

When the data for central navels are examined, it is evident that in average terms the within-season shipment pattern which had shown some shifts in the first postwar decade showed a stronger shift in the 1953-1957 period; very much smaller cumulative percentages of seasonal shipments were made by the end of the 15th week. This shift reflects the tendency toward elongation of the central navel shipping season after 1952-53 and some change of the within-season pattern of shipments and their shift toward the end of the season. This development continued through the 1957-58 to 1960-61 period, as can be seen in Table 43. In the final three years of the current period, however (granted

TABLE 43

Navel Oranges: Cumulative Distribution of Fresh Shipments Within the Season
By District (4-Year Averages), 1953-54 Through 1963-64

Central district											
Crop year	Weeks										Completed 100 percent weeks
	3	6	9	12	15	18	21	24	27	30	
	percent										
1953-54	19.2	39.6	61.4	77.7	90.1	98.7					21
1954-55	8.9	35.7	46.4	65.0	78.1	87.7	95.2	99.7			27
1955-56	6.2	21.4	38.9	54.9	68.0	79.4	88.5	94.7			30
1956-57	9.7	34.2	47.1	61.6	76.0	85.1	92.7	98.8			33
4-year average	11.0	32.7	48.4	64.8	78.0	87.7					28
1957-58	5.7	25.7	43.1	58.8	73.5	87.3	96.7	99.7			27
1958-59	5.2	24.7	36.0	49.7	62.8	76.4	88.1	96.1	99.9		30
1959-60	4.6	23.5	40.5	57.0	73.2	87.3	98.4	99.9			26
1960-61	3.8	34.0	55.2	73.9	89.3	98.7					21
4-year average	4.8	27.0	43.7	59.9	74.7	87.4	95.8				26
1961-62	8.3	41.3	62.0	80.8	92.3	99.6					20
1962-63	9.6	45.5	65.8	87.6	96.8	99.4	99.7	99.9			25
1963-64	5.6	26.7	39.8	56.2	73.2	87.8	98.3	99.9			25
3-year average	7.8	37.8	55.9	74.9	87.4	95.6					23

(Continued on next page.)

TABLE 43--continued.

Southern district											
Crop year	Weeks										Completed 100 percent weeks
	3	6	9	12	15	18	21	24	27	30	
	percent										
1953-54	0.6	2.8	9.6	24.4	41.5	60.7	81.7	96.9			28
1954-55	a/	1.1	3.7	13.8	29.2	48.1	68.2	87.8			32
1955-56	0.3	3.1	9.4	20.8	37.9	58.0	77.1	93.8			30
1956-57	0.3	1.5	5.8	14.6	27.0	45.4	66.0	85.3			32
4-year average	0.3	2.1	7.1	18.4	33.9	53.0	73.3	91.0			31
1957-58	1.3	10.1	29.2	47.6	67.1	85.3	99.2				23
1958-59	0.7	2.6	11.1	22.8	40.3	61.9	85.1	98.5			27
1959-60	1.1	7.5	12.8	25.9	43.5	63.2	86.1	98.8			27
1960-61	0.6	6.9	12.2	24.9	41.5	61.9	85.4	98.8			27
4-year average	0.9	6.8	16.3	30.3	48.1	68.1	89.0				26
1961-62	1.3	6.3	13.3	28.9	43.7	69.2	92.5	99.9			25
1962-63	0.7	4.1	11.2	23.4	41.7	65.1	85.5	98.2			28
1963-64	0.7	4.3	12.5	26.1	44.1	66.8	86.8	98.9			27
3-year average	0.9	4.9	12.3	26.1	43.2	67.0	88.3	99.0			27

a/ Less than 0.05.

Source: Developed by the authors from sources listed on page 181.

that it is three rather than four years) a return to the earlier pattern of within-season distribution with larger percentages shipped before 15 weeks seemed to be noted, while the identical percentage (87.4) was shipped by the end of 18 weeks in the most recent three-year average. Shipment of 87.4 percent was completed in an additional three weeks in the later 1950's.

In the southern navels, a qualitatively similar development occurred, although to a much less degree. Although there had been some shift in the first decade, there was less noticeable change in the 1953-1957 period compared with the corresponding periods for central navels. Over the postwar years as a whole, the shifting forward of the within-season pattern of southern navel shipments has been much less than that occurring in central navels. Here again the striking stability of pattern throughout the entire period is substantiated by Table 43, with the only change noted in the most recent period being the slightly smaller percentage shipped before 15 weeks in the last three-year average.

When valencias are considered, a still different picture emerges (see Table 44). There is less change reflected after 1954 when the two marketing orders were effected than that occurring in central navels; yet, the shift for the central valencias is noticeable. Here again the tendency in the more recent years has been back toward the pattern of the earlier years. As in central navels, central valencias have tended again, in the three-year average shown in Table 44, to ship a somewhat larger percentage early in the season, as was characteristic of the immediate postwar decade.

The situation in southern valencias is generally similar to that of the southern navels. The shifting forward of the within-season cumulative shipments of southern valencias, however, has been more marked than in navels. But even in southern valencias, the shift which occurred in the 1953-1957 period is much less than the development in central navels during that same period. Here again, a shift back to the earlier pattern and away from the "forward" trend noticed in the earlier 1950's has been observed in the last three years in the southern valencia within-season distribution of shipments. From Table 44 we note that in the 1957-58 through 1960-61 period an average of nearly 50 percent of the total shipments of District II had been made by the time the season was into its 24th week. During the last three years, this volume has been shipped during the 3 weeks previous to 24 weeks. Thus, the southern valencia shipments, which are by far the largest volume handled by any district

TABLE 44

Valencia Oranges: Cumulative Distribution of Fresh Shipments Within the Season
By District (4-Year Averages), 1953-54 Through 1963-64

Central district											
Crop year	Weeks										Completed 100 percent weeks
	3	6	9	12	15	18	21	24	27	30	
	percent										
1953-54	2.0	26.4	77.3	93.8	96.7						33
1954-55	1.3	23.3	62.3	89.6	96.1						36
1955-56	2.6	23.3	69.9	97.6	99.7						17 ^a /
1956-57	0.4	10.4	40.1	71.0	89.1						34
4-year average	1.6	20.8	62.4	88.0	95.4						30 ^a /
1957-58	3.4	26.0	66.7	94.5	98.7	99.7	99.9				22
1958-59	1.7	14.4	51.7	85.1	97.9	99.6	99.9				23
1959-60	2.8	32.5	71.5	92.4	97.8	99.1	99.3				34
1960-61	3.2	28.4	75.9	96.2	99.5	99.9	99.9				34
4-year average	2.8	25.3	66.5	92.1	98.5	99.6	99.8				28
1961-62	2.7	50.9	84.0	95.4	98.4	99.6					20
1962-63	23.3	78.9	96.0	99.2							15
1963-64	5.6	34.9	69.8	88.0	98.1	98.9	99.3	99.4	99.9		28
3-year average	10.5	54.9	83.3	94.2							21

(Continued on next page.)

TABLE 44--continued.

Crop year	Southern district										Completed 100 percent weeks
	Weeks										
	3	6	9	12	15	18	21	24	27	30	
	percent										
1953-54	b/	1.1	7.6	19.3	31.2	44.3	56.2	70.3	83.9	94.4	35
1954-55	0.2	1.1	5.4	14.2	25.3	39.7	51.9	64.8	79.1	89.4	40
1955-56	0.4	4.0	15.9	27.7	39.5	51.8	64.7	78.6	89.9	98.6	35
1956-57	b/	0.3	3.6	14.3	25.2	38.3	51.8	64.3	79.1	90.4	38
4-year average	0.3	1.6	8.1	18.9	30.3	43.5	56.2	69.5	83.0	93.2	37
1957-58	0.2	2.0	9.1	19.9	33.1	46.1	57.2	69.3	81.8	92.6	37
1958-59	0.2	0.9	5.5	13.5	22.1	32.3	45.2	56.7	69.0	83.4	39
1959-60	0.5	2.9	7.3	16.4	27.0	38.2	50.8	62.3	74.9	87.2	41
1960-61	0.2	1.2	6.1	16.0	25.2	34.8	46.2	57.5	69.7	82.6	43
4-year average	0.3	1.8	7.0	16.5	26.9	37.9	49.9	61.5	73.8	86.5	40
1961-62	0.2	3.4	10.3	20.1	29.2	39.3	50.2	61.5	74.9	86.2	40
1962-63	0.2	2.0	9.7	21.1	31.2	42.9	54.7	66.0	78.4	90.6	40
1963-64	1.7	7.9	15.9	26.4	40.5	54.3	67.6	81.1	93.0	99.1	34
3-year average	0.7	4.4	12.0	22.5	33.6	45.5	57.5	69.5	82.1	92.0	38

a/ Two carloads shipped week ending November 11 after 17-week intermission; four-year average is thus affected.

b/ Less than 0.05.

Source: Developed by the authors from sources listed on page 181.

at any period, seem also to be exhibiting very little change of within-season distribution of shipments when the two decades are observed as a whole.

The shipping experience we have been discussing reflects average tendencies during the indicated three-week periods in the two districts and two varieties. The difference between these data and those discussed earlier is that the former reflect broad average shifts over time, while the latter pictures what has happened week by week and year by year during the postwar period and after. Thus, the two ways of looking at the same developments are complementary. From both methods of analysis, it is clear that some shifting forward had occurred in the shipment patterns of both varieties and both of the districts in the earlier 1950's, most noticeably in the within-season shipment pattern of central navels, but these shifts have not seemed as demonstrable over the decade since 1953-54 as a whole.

Overlapping of District Shipments

The tendencies toward changing lengths of the marketing season, in combination with the changing distribution of within-season shipments, resulted in changing relationships among interdistrict shipments during the postwar years. As a consequence, the extent of overlapping of district shipments took on, even if temporarily, an increased dimension and importance.

The existence of overlap in district shipments is not a new problem. For a long time there have been periods when the central and southern districts have shipped simultaneously. But during relatively recent years when the central navel crop has increased while the southern valencia and navel crops have decreased, the interactions among district shipping overlap have become more significant.

The overlapping of shipments from the two districts is not necessarily a simple two-way matter, such as central and southern navels being shipped simultaneously or central and southern valencias being shipped during the same period. The existence of the two varieties in the two districts sets the stage for a number of different types of shipment overlaps. As the district volumes shift, as the lengths of the shipping seasons change, and as the within-season patterns of shipments vary, the extent and type of overlapping among district shipments change.

To show the various types of overlaps which in fact have occurred in recent years, the following combinations of district varietal shipments actually experienced are indicated.

1. Two-way overlaps.

a. Central and southern navels.

Shipments generally start for the central district shortly before those from the southern district. The overlap is thus just after the central season starts and from the first of the southern harvest (generally in November-December).

b. Central navels and valencias.

The central navels are at the end of their shipping season; central valencias are just starting (late spring).

c. Central navels and southern valencias.

Southern valencias from the previous harvest are still being shipped when central navels start their season (approximately in November) of a given year. Then, secondly, toward the end of the central navel harvest, southern valencias start their shipments (midsummer).

d. Southern navels and central valencias.

Southern navels are generally past the middle of their shipping season when central valencias start shipments (April-May).

e. Central and southern valencias.

Central valencias begin shipments shortly before or simultaneously with southern valencias (April-May).

2. Three-way overlaps.

a. Southern navels and central and southern valencias.

When southern navels are toward the conclusion of their shipments, central valencias and thereupon southern valencias are commencing (April-May).

b. Central and southern navels and central valencias.

Central navels are concluding shipments, southern navels are nearing the end, and central valencias are commencing (April-May).

- c. Central and southern navels and southern valencias.
Southern valencias are concluding shipments of the "previous" season as central navels and shortly thereafter southern navels start their new crop shipments (November-December).
- d. Central navels and central and southern valencias.
In 2 out of 19 years, this three-way overlap occurred. The beginning of the central navel season coincided with the end of the central valencia and southern valencia seasons. Although of little intrinsic significance, it is noted here for a complete listing of the overlap situation.

3. Four-way overlaps.

- a. Central and southern navels and central and southern valencias. Central navels and southern navels are at the middle or toward the conclusion of the season while central and southern valencias are commencing (spring-early summer).

All of the above combinations of the overlaps are not of equal importance, nor have they all occurred in all of the postwar years. But it may be noted that during the past several years all but one of the above combinations of overlapping have existed, and there has been a tendency toward aggravation of interdistrict problems associated with shipment overlapping.

Special Overlap Definition

In each overlap category, the period has been defined so as to include only the combination noted. That is, when discussing two-way overlap, the figures show the period of time when only two districts are shipping concurrently and not the period when shipments between those two are continuing but another district or variety has also started shipments. Each overlap discussion, therefore, excludes the other possibilities and does not continue through the cumulative shipments while such overlaps are joined by other districts and varieties. The latter are considered as separate cases and are discussed as different overlaps. For example, the central and southern districts both were

shipping navel oranges at the same time in 1959-60, from December 13 to March 13, a total of 14 weeks with 9,580 carloads of central navels and 4,544 carloads of southern navels, while neither district was shipping any other variety. There were actually two-way overlapping shipments of 24 weeks, during which time 13,188 carloads were shipped by central and 7,454 carloads by southern; but during these 10 additional weeks, other varieties were being shipped and, therefore, the classification shifts to a three-way overlap rather than a two-way overlap. Each category is selective and has been defined to exclude every other category.

In an earlier version of the study, two-way overlaps which were nonexclusive in scope--that is, included weeks and volume of shipments which ran concurrent with other varietal and district shipments--were tested for price influence. It seemed clear that this definition of overlap was not exclusive enough of other influences to be clearly indicated in price effects. Therefore, it is here suggested that this careful delineation of specific overlap, narrowly defined, may be more identifiable as an influence on price under further testing which has not as yet been attempted.

The description of the various types of overlap, the dates, volume of district shipment, and number of weeks of each overlapping situation will be covered in tables which have been designed to indicate the impact of overlapping volume. The explanation of each year's overlap, however, can be more clearly understood by studying these tables in conjunction with the pattern of overlapping shipments given in Diagram I. By checking the pattern of each season, one can more clearly interpret the length of overlap and the reason for termination. For example, the two-way overlap in 1945-46 is much shorter in duration and lower in central navel volume than 1946-47, in large part because the southern valencias from the year before were being shipped until January 19, thus cutting down the exclusively two-way overlap period by the length of time there was a three-way overlap instead. It is this information that is best transmitted by the pattern diagram. Therefore, each table should be read in conjunction with this pattern in order to understand the background for the figures given in each year. In all the tables, the current definition of a standard carload has been used--1,000 cartons at $37\frac{1}{2}$ pounds per carton--and all volume figures have been converted to this definition.

DIAGRAM I

Pattern of Overlapping Navel and Valencia Shipments: Central and Southern Districts
1945-46 Through 1963-64

	Weekly shipments ^{a/}	
	November	October
<u>1945-46</u>		
Central navels	x x x x x x x x x x x x x x x x x	
Central valencias		- - - - -
Southern navels	o o	
Southern valencias
<u>1946-47</u>		
Central navels	x x x x x x x x x x x x x x x x x x x	
Central valencias		- - - - -
Southern navels	o o	
Southern valencias
<u>1947-48</u>		
Central navels	x x x x x x x x x x x x x x x x x x x	
Central valencias		- - - - -
Southern navels	o o	
Southern valencias
<u>1948-49</u>		
Central navels	x x x x x x x x x x x x x x x x x	
Central valencias		- - - - -
Southern navels	o o	
Southern valencias

(Continued on next page.)

-100-

(Continued on next page.)

DIAGRAM I--continued.

	Weekly shipments ^{a/}																																																				October
	November																																																				
<u>1953-54</u>																																																					
Central navels	x x																										- - - - -																										-
Central valencias																											- - - - -																										
Southern navels	o o																										o o o o o o o o o o o o o o o o																										
Southern valencias																										
<u>1954-55</u>																																																					
Central navels	x x																										x x x x x x x																										
Central valencias	- -																										- - - - -																										- - - - -
Southern navels	o o																										o o o o o o o o o o o o o o o o																										
Southern valencias																										
<u>1955-56</u>																																																					
Central navels	x x																										x x x x x x x x x x x x																										
Central valencias	- - -																										- - - - -																										- - - - -
Southern navels	o o																										o o o o o o o o o o o o o o o o																										
Southern valencias																										
<u>1956-57</u>																																																					
Central navels	x x																										x x x x x x x x x x x x																										
Central valencias	-																										- - - - -																										- - - - -
Southern navels	o o																										o o o o o o o o o o o o o o o o																										
Southern valencias																										

(Continued on next page.)

DIAGRAM I--continued.

	Weekly shipments ^{a/}																																																			
	November																										October																									
<u>1957-58</u>																																																				
Central navels	x x																																																			
Central valencias	- - -																										- -																									
Southern navels	o o																																																			
Southern valencias																									
<u>1958-59</u>																																																				
Central navels	x x																																																			
Central valencias																											- -																									
Southern navels	o o																																																			
Southern valencias																									
<u>1959-60</u>																																																				
Central navels	x x																																																			
Central valencias																											- -																									
Southern navels	o o																																																			
Southern valencias ^{b/}																									
<u>1960-61</u>																																																				
Central navels	x x																																																			
Central valencias	-																										- -																									
Southern navels	o o																																																			
Southern valencias																									

(Continued on next page.)

DIAGRAM I--continued.

	Weekly shipments ^{a/}																																																			
	November																										October																									
<u>1961-62</u>																																																				
Central navels	x x																																																			
Central valencias																											- - - - -																									
Southern navels	o o																																																			
Southern valencias																									
<u>1962-63</u>																																																				
Central navels	x x																																																			
Central valencias																											- - - - -																									
Southern navels	o o																																																			
Southern valencias																									
<u>1963-64</u>																																																				
Central navels	x x																																																			
Central valencias																											- - - - -																									
Southern navels	o o																																																			
Southern valencias ^{c/}																									

^{a/} Weekly shipments are indicated by the following symbols: x, central navels; -, central valencias; o, southern navels; and ., southern valencias.

First shipment in November; the start of navel shipments is considered the beginning of each annual season.

^{b/} In 1959-60 (leap year), southern valencia shipments start November 1, 1959, and end October 30, 1960, making 53 shipments.

^{c/} Continues into the following year, 1964-65.

Source: Developed by the authors from sources listed on page 181.

Two-Way Overlaps

Navel Oranges.--The first set of tables cover two-way overlaps; the initial tabulation is for the overlap of central and southern navel oranges. Table 45 shows that the length of the exclusive two-way overlap between central and southern navels has been variable during the postwar years, but during the entire period considerable overlap prevailed. Between 1945-46 and 1953-54, the exclusive overlap period fluctuated from a low of 7 weeks (in a year for which the data has had to be estimated) to 16 weeks in 1946-47. The volume of shipments made during these "exclusive" overlap weeks showed 1946-47 to be nontypical for the earlier years with over 10,000 carloads shipped from central during the two-way overlap, while most years showed lower than 4,000 carloads in toto. Southern district overlapping navel volume was above 10,000 carloads in four of the first six years, and a definite break with the higher volume was indicated during the nonmarket agreement years if estimated data are used. After the marketing orders were established and operating, the number of weeks of exclusively two-way overlapping shipments ranged from 17 weeks down to 12 weeks in 1963-64; but the southern volume shipped during these weeks was remarkably stable--around 4,500 carloads for the past decade--while the central district shipped a highly fluctuating volume of navel oranges under regulation during the exclusively two-way overlap of the two districts.

If this tabulation (Table 45) is now compared with that which does not define two-way overlaps so narrowly, but rather includes all weeks in which central and southern districts are shipping navel oranges at the same time regardless of what else is being done (Table 46), one can both estimate the difference between the two interpretations of two-way overlaps and recognize that the overlap problem very much depends on the definition of overlap. When narrowly defined, there is very little difference in the number of weeks during which this double shipping has taken place over the entire period. The essential difference is in the volume affected. When interpreted as all the weeks when both districts shipped at the same time, the period of weeks seems to have lengthened perceptibly after 1953-54, affecting much larger volumes of navel orange shipments in the last decade.

When the data on the broad overlap volumes are examined in Table 46, certain changes seem to have occurred. The volume of central navels shipped during the period of overlap with southern navels tended to be larger throughout the 1953-54 to 1959-60 period than in the previous years. This is again

TABLE 45

Two-Way Overlap of Shipments: Central and Southern Navels

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central	Southern
				standard carloads	
1945-46	January 19, 1946	March 16, 1946	9	381	12,004
1946-47	December 7, 1946	March 22, 1947	16	10,202	12,392
1947-48	January 3, 1948	March 27, 1948	13	3,921	11,381
1948-49	December 25, 1948	March 12, 1949	12	2,967	7,424
1949-50	December 31, 1949	March 25, 1949	13	2,486	8,687
1950-51	December 30, 1950	March 31, 1951	14	3,899	10,133
1951-52	February 2, 1952	March 22, 1952	8	202	3,198
1952-53	February 7, 1953	March 21, 1953	7	1,063	3,926
1953-54	December 6, 1953	March 28, 1954	17	9,760	5,706
1954-55	December 12, 1954	March 27, 1955	16	8,648	5,947
1955-56	January 8, 1956	March 18, 1956	11	5,972	4,758
1956-57	December 23, 1956	March 24, 1957	14	6,632	4,738
1957-58	December 22, 1957	March 9, 1958	12	6,009	2,872
1958-59	December 7, 1958	March 8, 1959	14	10,524	4,176
1959-60	December 13, 1959	March 13, 1960	14	9,580	4,544
1960-61	January 1, 1961	March 12, 1961	11	3,892	4,012
1961-62	January 14, 1962	March 18, 1962	10	2,056	4,179
1962-63	December 30, 1962	March 24, 1963	13	4,176	4,458
1963-64	January 5, 1964	March 22, 1964	12	9,549	4,629

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 46

All Overlap of Shipments: Central and Southern Navels

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central	Southern
				standard carloads	
1945-46	December 1, 1945	March 16, 1946	16	7,570	14,331
1946-47	November 30, 1946	April 12, 1947	20	11,521	15,021
1947-48	December 6, 1947	March 27, 1948	17	8,124	11,521
1948-49	November 20, 1948	March 12, 1949	17	6,790	7,845
1949-50	December 10, 1949	April 8, 1950	18	4,643	10,887
1950-51	December 9, 1950	March 31, 1951	17	6,373	10,370
1951-52	December 15, 1951	April 5, 1952	17	5,242	9,172
1952-53	December 13, 1952	May 23, 1953	24	8,512	19,992
1953-54	December 6, 1953	April 11, 1954	19	9,803	7,304
1954-55	November 21, 1954	May 8, 1955	25	11,803	10,041
1955-56	December 11, 1955	June 10, 1956	27	10,655	12,705
1956-57	December 2, 1956	July 7, 1957	32	10,709	12,275
1957-58	December 8, 1957	May 4, 1958	22	9,112	4,835
1958-59	November 30, 1958	May 31, 1959	27	15,303	10,438
1959-60	November 15, 1959	April 24, 1960	24	13,188	7,454
1960-61	November 13, 1960	March 26, 1961	20	7,882	5,888
1961-62	November 19, 1961	March 25, 1962	19	5,419	5,391
1962-63	November 25, 1962	April 28, 1963	23	8,930	6,861
1963-64	November 24, 1963	April 26, 1964	23	15,591	7,196

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

true for 1963-64 when approximately the same volume was shipped in overlapping shipments with District II, as had been true in 1958-59. The southern navel overlap volume reflects no clear-cut tendency in recent years as does the central navel overlap volume, with the possible additional comment that it has in general decreased. Still, it is interesting to note that in each of the last seven years the overlap volume as broadly interpreted has been larger for central navels than for southern navels, regardless of the length of time the overlap lasted.

The data contained in Table 45 (showing the exclusive two-way overlap volume), which are most relevant to our present study, indicate the increased shipments of central navels during heavy production years and also seem to show an overall increase in overlap volume which may be as much the result of increased production in the area in general as any change in regulation of shipments. The more noticeable change is in southern overlap volume: (1) There is a definite decrease in overlap volume after 1950-51, and (2) there is a remarkable stability of overlap volume at the lower figure of close to 4,500 carloads in all but one of the past nine years. Thus, the southern district has shipped a smaller but steadier volume of navel oranges under regulation in an exclusively two-way relationship with central navels over the past decade than was characteristic of the earlier years.

Valencia Oranges.--The second overlap experience to be considered is that of central and southern valencias. The two tables (47 and 48) covering the two interpretations of overlapping shipments are constructed in the same manner as those showing navel orange shipments for the two districts. Table 47 illustrates the exclusive two-way overlap; Table 48 covers the two-way overlap volume during all weeks when the districts were shipping at the same time, including weeks of other shipments as well.

Under the earlier interpretation of broad overlap (see Table 48), the length of overlap varied rather widely until 1953-54--from 10 weeks in 1945-46 and 1950-51 to 29 weeks in 1946-47. But, beginning with 1953-54, an increased overlap period was introduced--as long as 36 weeks in 1954-55. The essential point is that the valencia overlap of the two districts in recent years has tended to occur over a longer period than prior to 1953-54. This lengthening of the overlap interval in valencias in these middle years is similar to the experience in navel shipments.

TABLE 47
Two-Way Overlap of Shipments: Central and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central	Southern
				standard carloads	
1945-46	June 1, 1945	June 22, 1945	4	129	7,499
1946-47	June 7, 1946	October 18, 1946	20	830	32,708
1947-48	July 3, 1947	October 9, 1947	15	94	22,082
1948-49	May 28, 1948	June 25, 1948	6	338	5,029
1949-50	July 15, 1949	August 12, 1949	5	9	6,070
1950-51	June 23, 1950	July 7, 1950	3	11	2,760
1951-52	June 21, 1952	--	1	3	1,258
1952-53	June 27, 1953	July 18, 1953	4	41	6,047
1953-54	June 20, 1954	October 24, 1954	19	264	14,914
1954-55	July 3, 1955	November 6, 1955	19	220	17,327
1955-56	November 13, 1955	--	1	3	1,820
	July 8, 1956	July 15, 1956	2		
1956-57	July 14, 1957	October 27, 1957	16	352	11,918
1957-58	May 18, 1958	August 10, 1958	13	1,323	7,922
1958-59	June 6, 1959	August 23, 1959	12	1,032	8,768
1959-60	May 22, 1960	October 2, 1960	14	1,188	7,563
1960-61	May 21, 1961	July 30, 1961	11	577	5,480
1961-62	May 13, 1962	August 12, 1962	14	620	4,965
1962-63	June 9, 1963	July 28, 1963	8	231	3,742
1963-64	May 31, 1964	October 4, 1964	19	1,669	8,066

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 48

All Overlap of Shipments: Central and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central	Southern
				standard carloads	
1945-46	April 20, 1946	June 22, 1946	10	3,850	9,715
1946-47	April 5, 1947	October 18, 1947	29	3,912	35,526
1947-48	May 1, 1948	October 16, 1948	24	3,398	28,109
1948-49	April 30, 1949	July 2, 1949	10	1,071	5,345
1949-50	May 13, 1950	August 12, 1950	14	844	13,283
1950-51	May 5, 1951	July 7, 1951	10	2,123	7,170
1951-52	April 19, 1952	June 21, 1952	10	2,538	7,209
1952-53	May 2, 1953	July 18, 1953	12	3,720	11,534
1953-54	April 11, 1954	November 14, 1954	32	2,741	18,486
1954-55	April 3, 1955	December 4, 1955	36	3,348	21,051
1955-56	April 22, 1956	July 15, 1956	13	1,051 ^{b/}	6,095 ^{b/}
1956-57	March 31, 1957	November 17, 1957	34	3,491	17,246
1957-58	March 23, 1958	August 10, 1958	21	3,966	8,829
1958-59	March 22, 1959	August 23, 1959	23	4,149	11,497
1959-60	March 20, 1960	November 6, 1960	34	4,186	14,330
1960-61	March 19, 1961	July 30, 1961	20	2,395	6,389
1961-62	April 1, 1962	August 12, 1962	20	1,835	5,841
1962-63	March 21, 1963	July 28, 1963	15	2,014	5,443
1963-64	March 19, 1964	October 4, 1964	25	5,211	8,890

(Continued on next page.)

TABLE 48--continued.

- a/ Shipments are quoted by date of end of week, Sunday, 12:01 a.m.
- b/ Although the figure noted in the table is the more realistic one, if the two carloads shipped from the central district in November are considered the termination of the overlap, the figures would be:
30 weeks, 10,524 cars for central valencias and 30 weeks, 19,098 cars for southern valencias, since 17 additional weeks of southern valencia shipments would be included in the overlap period.

Source: Developed by the authors from sources listed on page 181.

When the volume of central and southern valencias involved in the overlap is considered in the broader interpretation, no persistent tendency is found. The number of cars of central valencias shipped during the overlap with southern valencias has been variable and has not trended up or down over the postwar years. In southern valencias shipped during the overlap with central valencias, no pronounced trend is apparent in terms of carloads. When recognition is given to the downward trend which has occurred in the size of southern valencia crops, however, there is evidently some increase in the proportion of the southern valencia crop shipped during the overlapping with central valencia shipments. The impact of the central and southern valencias overlap on southern valencias during the past decade has been more in terms of the lengthening of the overlap period than in terms of the volume of central valencias or southern valencias involved, although the extension has not continued to be as lengthy as the over-30-week experience of the later 1950's.

In the exclusive two-way overlap between central and southern valencia shipments (see Table 47), the change in number of weeks that occurred is more pronounced. In the earlier period, there were only two years of lengthy overlapping shipments covering a relatively large volume of southern valencia shipments. In the years since the new marketing orders, however, there have been only two years in which the overlapping periods have been short. In 1953-54, 1954-55, and again in 1963-64, the overlap has been 19 weeks long. The interesting difference in these three years is that the volume covered by the 19-week overlap in shipments of southern valencias in the first two years noted was nearly double that of the 1963-64 overlap period. The volume of valencia shipments from the central district included during the overlap weeks seems relatively small in comparison. In most years it has been actually very small, and in the 1963-64 overlap it reached the highest volume on record--1,609 carloads shipped during the four months of overlap, still only one-fifth of the overlap volume of southern valencia shipments. Again, the diagrammatic presentation of overlap should be consulted for the rationale for the overlap situation.

Central Navels and Southern Valencias.--The final two-way overlap to be shown in both treatments of the "overlap definition" is that between central and southern valencias (see Tables 49 and 50). This overlap occurs, it will be remembered, at the start of the central navel season while southern valencias are still being shipped. It occurs again when central navels are still being

TABLE 49

Two-Way Overlap of Shipments: Central Navels and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central navels	Southern valencias
				standard carloads	
1945-46	November 10, 1945	November 17, 1945	2	908	1,053
1946-47	November 1, 1946	November 23, 1946	4	1,283	207
1947-48	November 8, 1947	November 29, 1947	4	3,257	2,301
1948-49			0	0	0
1949-50	November 12, 1949	December 3, 1949	4	2,766	696
1950-51	November 18, 1950	December 2, 1950	3	1,199	112
1951-52	November 17, 1951	December 8, 1951	4	2,676	854
1952-53	November 15, 1952	December 6, 1952	4	2,567	506
1953-54	November 22, 1953	November 29, 1953	2	832	366
1954-55	--	--	0	0	0
1955-56	--	--	0	0	0
1956-57	November 18, 1956	November 25, 1956	2	1,137	259
1957-58	November 24, 1957	December 1, 1957	2	1,100	78
1958-59	November 9, 1958	November 23, 1958	3	845	120
1959-60	November 11, 1959	November 8, 1959	2	108	1,292
1960-61	--	--	0	0	0
1961-62	November 12, 1961	--	1	5	409
1962-63	November 11, 1962	November 18, 1962	2	323	404
1963-64	November 10, 1963	November 17, 1963	2	210	284

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 50

All Overlap of Shipments: Central Navels and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central navels	Southern valencias
				standard carloads	
1945-46	November 17, 1945	January 12, 1946	9	8,098	1,544
1946-47	November 9, 1946	November 30, 1946	4	2,757	215
	March 29, 1947	April 12, 1947	3		
1947-48	November 8, 1947	December 27, 1947	8	7,460	2,438
1948-49	November 20, 1948	December 18, 1948	5	3,823	359
1949-50	November 12, 1949	December 24, 1949	7	4,919	711
1950-51	November 18, 1950	December 23, 1950	6	3,673	124
1951-52	November 17, 1951	January 19, 1952	10	7,114	826
1952-53	November 15, 1952	January 31, 1953	12	4,072	543
1953-54	November 22, 1953	December 20, 1953	5	3,848	368
1954-55	November 7, 1954	December 5, 1954	5	3,645	1,280
	April 3, 1955	May 8, 1955	6		
1955-56	November 13, 1955	January 1, 1956	8	4,119	2,863
	April 22, 1956	June 3, 1956	7		
1956-57	November 11, 1956	December 16, 1956	6	5,190	5,359
	March 31, 1957	July 7, 1957	15		

(Continued on next page.)

TABLE 50--continued.

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central navels	Southern valencias
				standard carloads	
1957-58	November 3, 1957	December 15, 1957	7	4,425	1,612
	March 23, 1958	May 4, 1958	7		
1958-59	November 9, 1958	November 30, 1958	4	5,623	2,864
	March 15, 1959	May 31, 1959	12		
1959-60	November 1, 1959	December 6, 1959	6	3,716	1,899
	March 20, 1960	April 24, 1960	6		
1960-61	November 6, 1960	December 25, 1960	8	3,994	491
	March 19, 1961	March 26, 1961	2		
1961-62	November 12, 1961	January 7, 1962	9	3,368	799
	March 25, 1962	--	1		
1962-63	November 11, 1962	December 23, 1962	7	5,077	604
	March 31, 1963	April 28, 1963	5		
1963-64	November 10, 1963	December 29, 1963	8	5,684	428
	April 19, 1964	April 26, 1964	2		

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

shipped as the southern valencia shipments commence the next season. It is in this overlap that the different interpretations of the overlapping of shipments are most noticeable in changing the perspective. It was the latter segment of the overlap which lengthened noticeably after 1952-53 under the broader interpretation, as illustrated in Table 50. The length of the overlapping period headed upward during the mid-1950's, retreated somewhat during the last four years, yet covered over 5,000 carloads of central navels during the overlap. The southern valencia shipments affected were quite small in recent years, although they had been more sizeable in the mid-1950's--even reaching over 5,000 carloads shipped during overlap in the bumper year of 1956-57. The large volume of shipments during this interpretation of overlap of the different varieties shipped by the two districts seems to have decreased substantially in the last few years. Thus, the tendency shown in the mid-1950's to ship increasing volume under broadly interpreted overlapping conditions seems to have been definitely modified since 1960 as the number of weeks of overlap has decreased.

The volume of central navels shipped during this overlap period shows at a much lower figure, in part because of shipment spacing previously discussed but also in part because the shipments have tended in recent years to take place during the three-way and four-way overlap conditions as the central navel shipments start in a given season. In the same way, volume of southern valencia shipments show smaller volume and considerable fluctuation. It is the more noticeable, however, because for several years between 1955-1960 a very large volume was shipped simultaneously from both districts.

By the exclusive overlap interpretation, however, in which price impact might be more clear-cut (see Table 49), there has been very little change over the years in number of weeks during which central navels and southern valencias are shipping simultaneously and no other variety is being shipped by either district. The volume affected by such shipment in both districts is extremely variable and cannot be said to show any trend, except that central navels have had fewer shipments so bracketed in recent years, not because overlapping shipments are less but because the overlap is more often three-way in extent.

Final Two-Way Overlaps.--One more two-district, two-variety overlap remains to be discussed--the concurrent shipment of southern navels and central valencias. For this case, the overlap data are shown in Table 51.

Examination of the southern navel and central valencia overlap experience, which occurs toward the end of the shipping season of the southern navels and

TABLE 51

Two-Way Overlap of Shipments: Southern Navels and Central Valencias

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Southern navels	Central valencias
				standard carloads	
1945-46	April 6, 1946	April 13, 1946	2	1,469	21
1946-47	--	--	0	0	0
1947-48	April 10, 1948	April 24, 1948	3	3,483	33
1948-49	April 16, 1949	April 23, 1949	2	325	6
1949-50	April 15, 1950	May 6, 1950	4	3,865	210
1950-51	April 14, 1951	April 28, 1951	3	3,409	89
1951-52	April 12, 1952	--	1	610	327
1952-53	--	--	0	0	0
1953-54	--	--	0	0	0
1954-55	--	--	0	0	0
1955-56	--	--	0	0	0
1956-57	--	--	0	0	0
1957-58	--	--	0	0	0
1958-59	--	--	0	0	0
1959-60	--	--	0	0	0
1960-61	--	--	0	0	0
1961-62	--	--	0	0	0
1962-63	--	--	0	0	0
1963-64	--	--	0	0	0

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

^{b/} It should be especially noted that no overlap of fresh shipments took place after this year.

Source: Developed by the authors from sources listed on page 181.

overlaps the start of shipments of central valencias, indicates that no major changes occurred throughout the period as a whole when given the broad overlap interpretation. The length of overlap after 1953-54 was not unusual compared with previous years. Similarly, the volume of southern navels and central valencias shipped simultaneously was not noticeably out of line after 1952-53 with the corresponding volumes of the years prior to 1952-53.

However, under the carefully defined exclusive interpretation of the two-way overlap, there is a striking difference between the two decades surveyed. After 1951-52, there was no year in which southern navels and central valencias were shipped simultaneously, with no other district or variety being shipped. Reference to the pattern diagram will show that this was in large part a reflection of any lengthening, however slight, of the central navel season which would therefore create a three-way overlap at the start of the central valencia shipments which characteristically overlap the latter part of the southern district shipment of navel oranges.

Two additional two-way overlaps remain for consideration. Central navel and valencia shipments are one of the possible remaining combinations. Here there is no exclusive two-way overlap; the explanation for this is most clearly shown by the pattern diagram where it can be seen that all central district navel-valencia overlapping shipments that take place are subsumed by other more extensive overlaps. The lengthening of the season for both varieties, which has already been touched upon, has meant longer overlapping shipments within the central district but has also meant more three- and four-way overlaps at the same time. Only in the short crop season of 1961-62 was there literally no overlap of shipments at all, as had been true during several years in the first postwar decade.

Particularly during the 1955-56 and 1956-57 seasons, the overlap periods of the central district for its own fruit were of considerable length. The volume of oranges involved was by no means insignificant for either central navels or valencias. This situation continued through the 1950's and was true again in the 1963-64 season, indicating a substantial elongating of the central navel shipping period. Thus, within the central district itself, the shipment overlapping reached significant proportions yet was a part of a broader total overlap.

The final possible two-way overlap, also intradistrict between southern navel and valencia shipments, is a somewhat different situation although the

first conclusion is the same. That is, there are no exclusive two-way overlaps of the two varieties within the single district. Checking the pattern diagram of shipments, it will be seen that the explanation again lies in the broader overlapping of other districts and other varieties. In only one of the 19 years did the southern navels and valencias experience one week of exclusive two-way overlap and that was the unique year of 1948-49.

Three-Way Overlaps

Turning to the multiple overlaps, consideration clearly must be focused on the changes touched on by the discussion already begun, the first of which is the three-way simultaneous shipment of southern navels, central valencias, and southern valencias (see Table 52). This is not a recent development but has prevailed during the entire postwar period.

In this three-way overlap, which excludes all overlaps except the weeks these three were shipping concurrently, the early 1950's show a greater length of overlap and volume of shipments under overlapping conditions than before or since. There has been a decrease in overlapping volume since that time, in part because of decreases in southern valencia production but also in part because of realignments, different patterns of within-season shipments, and increases in four-way overlap which seem more characteristic of some of the later years.

From the table, the changes in volume of the three components show that southern valencias are particularly affected. The variations in the other two are roughly parallel. But the years in which no three-way overlap is shown and the decreases of the past five years must be read in the light of the pattern diagram which indicates the prevalence of four-way overlap as the main change represented by the smaller volumes shown in the table. The lengthening of the central navel season, in large part since 1953-54, has been the major factor in the change by making the possible three-way overlap a four-way situation instead.

The changes in interdistrict relationships in response to the changing length of shipping periods, the pattern of seasonal shipments, and their volume is ever more dramatically shown in Table 53 covering the three-way overlap of central and southern navels and central valencias. Here the fluctuations represent very clearly the positioning of the central valencia shipping season and the timing of its first shipments. The lengthening of the central navel

TABLE 52

Three-Way Overlap of Shipments: Southern Navels and Central and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume		
	From	To	Number of weeks	Southern navels	Central valencias	Southern valencias
1945-46	April 20, 1946	May 25, 1946	6	3,004	3,721	2,216
1946-47	April 5, 1947	May 31, 1947	9	6,939	3,082	2,818
1947-48	May 1, 1948	June 26, 1948	9	2,629	3,304	6,027
1948-49	April 30, 1949	May 21, 1949	4	55	733	316
1949-50	May 13, 1950	July 8, 1950	9	2,280	834	7,213
1950-51	May 5, 1951	June 16, 1951	7	2,204	2,112	4,410
1951-52	April 19, 1952	June 14, 1952	9	2,142	2,535	5,951
1952-53	May 30, 1953	June 20, 1953	4	522	1,307	4,732
1953-54	April 18, 1954	June 13, 1954	9	3,472	2,461	2,100
1954-55	May 15, 1955	June 26, 1955	7	802	2,292	3,489
1955-56	June 17, 1956	July 1, 1956	3	78	23	2,511
1956-57	--	--	0	0	0	0
1957-58	May 11, 1958	--	1	6	571	362
1958-59	--	--	0	0	0	0
1959-60	May 1, 1960	May 15, 1960	3	90	1,634	631
1960-61	April 2, 1961	May 14, 1961	7	1,620	1,811	890
1961-62	April 1, 1962	May 6, 1962	6	1,617	935	614
1962-63	April 5, 1963	May 2, 1963	5	333	1,634	1,620
1963-64	May 3, 1964	May 24, 1964	4	496	2,621	752

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 53

Three-Way Overlap of Shipments: Central and Southern Navels and Central Valencias

Crop year	Overlap dates ^{a/}			Overlap volume		
	From	To	Number of weeks	Central navels	Southern navels	Central valencias
				standard carloads		
1945-46	--	--	0	0	0	0
1946-47	April 5, 1947	April 12, 1947	2	2	2,612	18
1947-48	--	--	0	0	0	0
1948-49	--	--	0	0	0	0
1949-50	April 1, 1950	April 8, 1950	2	4	2,115	4
1950-51	--	--	0	0	0	0
1951-52	March 29, 1952	April 5, 1952	2	9	1,678	287
1952-53	March 28, 1953	April 25, 1953	5	95	6,397	1,019
1953-54	April 4, 1954	--	1	39	835	2
1954-55	--	--	0	0	0	0
1955-56	March 25, 1956	April 15, 1956	4	1,271	3,257	67
1956-57	--	--	0	0	0	0
1957-58	March 16, 1958	--	1	397	352	6
1958-59	--	--	0	0	0	0
1959-60	--	--	0	0	0	0
1960-61	--	--	0	0	0	0
1961-62	--	--	0	0	0	0
1962-63	--	--	0	0	0	0
1963-64	March 29, 1963	April 14, 1963	3	568	1,482	308

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

season in conjunction with the earlier shipping of central navels is the major factor in this three-way overlap, since southern navels tend to be somewhat more stable both in starting and in length of season than the other two.

The final three-way overlap of significance is shown in Table 54. The simultaneous shipment of central and southern navels with southern valencias is tabulated there, and it can be seen that this three-way overlap seems to show somewhat less change in volume of southern valencias shipped but definitely increasing volume in central navels shipped and varying volume in southern navels during somewhat longer periods of the overlap in recent years. The stability in timing of southern valencia shipments is already noted, but again it is shown in this three-way overlap which takes place at the end of the southern valencia season. Changes in recent years are particularly the result of the positioning of the central valencia shipments in the second half of the overlap pattern as well as the time of the start of the southern navel shipments each year.

The only other possible exclusively three-way overlap--central navels with central and southern valencias--has taken place so seldom that it does not warrant discussion here, nor can it be of any particular economic consequence since it is in large part the result of the late shipment of central valencias after the season has almost literally concluded, often with an intermission of several weeks before a few or a single carload is shipped.

Four-Way Overlaps

The final type or category of overlap situation considered is the four-way one in which both navels and valencias are concurrently shipped from the central and southern districts. Such a situation did not occur during the postwar years prior to 1952-53; but, during what we might call the "stretch out" period, it assumed considerable proportions as can be seen from the tabulation. Here the dimension of what has been called the "overlap problem" really becomes clearly defined.

Through the postwar years to the termination of Marketing Order 66 (the initial citrus regulation which covered both navel and valencia oranges in California), there were no overlapping shipments of both districts and both varieties. Leaving aside for the moment the first two years included in Table 55, which of necessity must be estimated in whole or in part from industry data, the following seven years had four-way overlapping shipments of

TABLE 54

Three-Way Overlap of Shipments: Central and Southern Navels and Southern Valencias

Crop year	Overlap dates ^{a/}			Overlap volume		
	From	To	Number of weeks	Central navels	Southern navels	Southern valencias
				standard carloads		
1945-46	December 1, 1945	January 12, 1946	7	7,190	2,328	491
1946-47	November 30, 1946	--	1	1,472	1,447	8
	March 29, 1947	--	1			
1947-48	December 6, 1947	December 27, 1947	4	4,203	140	138
1948-49	November 20, 1948	December 18, 1948	5	3,823	420	359
1949-50	December 10, 1949	December 24, 1949	3	2,154	85	16
1950-51	December 9, 1950	December 23, 1950	3	2,474	237	12
1951-52	December 15, 1951	January 1, 1952	7	4,830	1,191	41
1952-53	December 13, 1952	January 31, 1953	8	6,360	1,505	37
1953-54	December 6, 1953	December 20, 1953	3	3,017	64	2
1954-55	November 21, 1954	December 5, 1954	3	2,571	4	141
1955-56	December 11, 1955	January 1, 1956	4	2,343	88	91

(Continued on next page.)

TABLE 54--continued.

Crop year	Overlap dates ^{a/}			Overlap volume		
	From	To	Number of weeks	Central navels	Southern navels	Southern valencias
				standard carloads		
1956-57	December 2, 1956	December 16, 1956	3	2,897	36	11
1957-58	December 8, 1957	December 15, 1957	2	2,057	24	26
1958-59	November 30, 1958	--	1	1,587	721	15
	March 15, 1959	--	1			
1959-60	November 15, 1960	December 25, 1960	4	2,791	210	290
1960-61	November 13, 1961	December 25, 1961	7	3,643	590	197
1961-62	November 19, 1961	January 7, 1962	8	3,107	1,120	360
	March 25, 1962	--	1			
1962-63	November 25, 1962	December 23, 1962	5	4,387	1,567	110
	March 31, 1963	April 14, 1963	3			
1963-64	November 24, 1963	December 29, 1963	6	5,037	711	399

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 55

Four-Way Overlap of Shipments: Central and Southern Navels and Central and Southern Valencias
1952-53 Through 1963-64

Crop year	Overlap dates ^{a/}			Overlap volume			
	From	To	Number of weeks	Central navels	Southern navels	Central valencias	Southern valencias
				standard carloads			
1952-53	May 2, 1953	May 23, 1953	4	7	3,748	2,373	756
1953-54	April 11, 1954	--	1	4	763	10	2
1954-55	April 3, 1955	May 8, 1955	6	585	4,091	781	235
1955-56	April 22, 1956	June 10, 1956	8	1,068	4,602	1,026	2,201
1956-57	March 31, 1957	July 7, 1957	15	1,142	7,501	3,112	4,364
1957-58	March 23, 1958	May 4, 1958	7	650	1,587	2,072	544
1958-59	March 22, 1959	May 31, 1959	11	3,191	5,542	3,117	2,729
1959-60	March 20, 1960	April 24, 1960	6	587	2,683	1,361	429
1960-61	March 19, 1961	March 26, 1961	2	47	1,238	7	19
1961-62	--	--	0	0	0	0	0
1962-63	April 21, 1963	April 28, 1963	2	6	707	149	81
1963-64	April 19, 1964	April 26, 1964	2	23	763	921	72

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

considerable volume for each district and each variety, ranging in duration from 6 to 15 weeks. Since 1960-61 this situation has changed again; and in the past four years the four-way overlap, while it did not disappear, has ceased to include any significant volume of fresh shipments of oranges.

For the six years of the mid-1950's, the four-way overlap was not only characteristic of each season but was extensive. The volume of shipments made during the four-way overlap was more than just a casual amount. The 1956-57 season was uniquely large in the overlap period, and the volume shipped by each district in each variety was a sizeable proportion of the bumper crop. The year 1958-59 was quite similar. Thus, in the four-way overlap, as also can be seen in most of the three-way overlaps, there was an intensification of the overlap situation related to the combined interactions of changing volumes in the two districts, the changing length of the shipping periods, and the shifting of the seasonal pattern of shipments of the two varieties from the two districts.

The four-way overlap has been two weeks or less with relatively small total volume affected since 1960. This is particularly noticeable in central navels, since the overlap period is at the end of its crop shipment. In other words, the shifting of the seasonal pattern which seemed clearly evident in the 1950's has not seemed to continue into the 1960's, in part because of two short crop navel orange years but also in part because of somewhat later seasonal starts for valencia shipments. Thus, the seasonal pattern of shipments of the two varieties from the two districts has shifted again and, it would seem, back to more traditional channels.

Comparative Detail on Overlapping Shipments

To illustrate the differing overlap situations more in detail, the pattern of overlapping shipments for both the central and southern districts for both navel and valencia oranges is tabulated in its entirety in Table 56 for the 1955-57 interval. For these two years, the volume of weekly fresh shipments is charted throughout the season for each district and each variety and placed in such a way as to indicate the periods of time during which the various shipments can be seen to be made simultaneously. It will be noted that, although the navel oranges are roughly a "winter" crop and the valencias are shipped during late summer and fall, during these years both districts were shipping navels, both were shipping valencias, and no district had any great period of

TABLE 56

Detail of Overlap of Shipments: Central and Southern Navels and
Central and Southern Valencias, 1955-1957

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
standard carloads				
Two-way, 1-week overlap				
1955--week ending:				
November 13			1	470
Three-way, 3-week overlap				
November 20	2		2	323
November 27	95		2	189
December 4	669		4	106
Three-way, 4-week overlap				
December 11	838	4		52
December 18	601	18		25
December 25	421	25		16
1956--week ending:				
January 1	676	48		6
Two-way, 11-week overlap				
January 8	808	138		
January 15	671	200		
January 22	636	293		
January 29	612	259		
February 5	716	314		
February 12	619	525		
February 19	509	503		
February 26	494	554		
March 4	442	682		
March 11	455	791		
March 18	501	890		
Three-way, 4-week overlap				
March 25	491	836	5	
April 1	312	1,010	19	
April 8	319	940	8	
April 15	254	739	41	
Four-way, 8-week overlap				
April 22	301	951	70	11
April 29	208	954	140	20
May 6	135	946	139	43
May 13	158	738	225	82
May 20	145	616	200	214
May 27	156	457	214	470
June 3	44	203	91	612
June 10	9	116	31	930

(Continued on next page.)

TABLE 56--continued.

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
standard carloads				
Three-way, 3-week overlap				
<u>1956--week ending:</u>				
June 17		50	10	958
June 24		33	6	934
July 1		1	9	825
Two-way, 2-week overlap				
July 8			1	700
July 15			1	800
No overlap, 16 weeks				
July 22				849
July 29				845
August 5				850
August 12				891
August 19				835
August 26				872
September 2				902
September 9				915
September 16				1,042
September 23				972
September 30				900
October 7				830
October 14				793
October 21				759
October 28				771
November 4				637
Three-way, 1-week overlap				
November 11	15		2	410
Two-way, 2-week overlap				
November 18	466			220
November 25	765			60
Three-way, 3-week overlap				
December 2	778	2		8
December 9	1,360	19		3
December 16	997	18		1
Two-way, 14-week overlap				
December 23	454	28		
December 30	585	47		
<u>1957--week ending:</u>				
January 6	601	80		
January 13	707	138		

(Continued on next page.)

TABLE 56--continued.

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
standard carloads				
(Two-way, 14-week overlap--continued)				
<u>1957--week ending:</u>				
January 20	504	197		
January 27	651	246		
February 3	670	253		
February 10	642	448		
February 17	527	466		
February 24	407	408		
March 3	382	502		
March 10	380	735		
March 17	362	750		
March 24	305	830		
Four-way, 15-week overlap				
March 31	298	864	7	1
April 7	295	864	6	1
April 14	266	968	2	1
April 21	223	914	33	6
April 28	114	885	148	14
May 5	22	953	195	26
May 12	5	727	300	72
May 19	1	633	392	225
May 26	0	586	431	337
June 2	0	381	431	598
June 9	4	215	415	704
June 16	4	64	322	691
June 23	1	40	275	654
June 30	2	23	236	722
July 7	1	1	175	671
Two-way, 16-week overlap				
July 14			150	785
July 21			72	813
July 28			64	873
August 4			33	834
August 11			27	847
August 18			10	860
August 25			1	812
September 1			1	765
September 8			3	769
September 15			4	928
September 22			1	942
September 29			3	896
October 6			6	802
October 13			4	658
October 20			0	660
October 27 ^{a/}			2	654

^{a/} Start of new navel season (Central) and three-way overlap, November 3.
Source: See page 181.

time during which it alone marketed its harvest. For example, during the only "nonoverlap," southern valencias were shipped from the week ending July 22 through the week ending November 4, 1956 (a period of 16 weeks) without any competition from other California oranges.^{1/} From January 1 to March 25, 1956, the central and southern districts were shipping navels simultaneously. The first three-way overlap added central valencias to the previous two for four weeks; then, both districts shipped both varieties--a four-way overlap--for eight weeks, and so on.

Table 57 performs the same function for the most recent two-year interval. Starting with November 11, 1962, when the central navel shipments got under way, the full pattern of weekly regulated fresh shipments is noted through November 8 of 1964. Although there are still only 14 weeks between August 4 and November 3, 1963, when one district (southern) is shipping one variety and again from October 11, 1964, for five weeks, there are only two weeks in each year--both in April--when there are four-way overlaps. Navel oranges, however, are never shipped alone during either of the intervals illustrated. Central valencias also are never shipped at a time when they are the only California oranges on the market.

The major difference to be noted in the two detailed examples of overlapping conditions is that, although overlapping prevails in both periods, four-way overlaps are shorter while two- and three-way overlaps continue to be the established pattern.

Summary of Two-District, Two-Variety Overlap Development

To summarize the discussion of the problem of overlapping orange shipments for the central and southern districts, it seems relevant to chart the number of weeks during which either district ships either variety alone. In this way an assessment of the total problem can be made, and a judgment of changing conditions can be backed by specific information. Table 58 thus has been drawn up

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1/ From a strictly technical point of view, it must be noted that two carloads of valencias were shipped from the central district on November 11, 1956, which in a sense means that the entire one-district southern-valencia period might be considered "overlapped" by central. Also, two carloads of navel oranges were shipped by District IV (Edison) during the week ending November 4, 1956. Without this quibble, however, there were at least 15 weeks of "no overlap" for southern valencia shipments.

TABLE 57

Detail of Overlap of Shipments: Central and Southern Navels and
Central and Southern Valencias, 1962-1964

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
<u>1962--week ending:</u>	standard carloads			
	Two-way, 2-week overlap			
	November 11	13		229
	November 18	310		175
	Three-way, 5-week overlap			
	November 25	568	2	58
	December 2	834	10	13
	December 9	1,297	39	13
	December 16	1,186	82	3
	December 23	823	89	8
<u>1963--week ending:</u>	Two-way, 13-week overlap			
	December 30	484	74	
	January 6	576	107	
	January 13	641	189	
	January 20	748	215	
	January 27	626	325	
	February 3	368	276	
	February 10	333	277	
	February 17	152	298	
	February 24	121	461	
	March 3	90	554	
	March 10	24	598	
	March 17	2	553	
	March 24	11	531	
	Three-way, 3-week overlap			
	March 31	19	475	3
	April 7	16	535	10
	April 14	5	464	11
	Four-way, 2-week overlap			
	April 21	4	376	17
	April 28	2	331	132
	Three-way, 5-week overlap			
	May 5		207	147
	May 12		88	234
	May 19		30	349
	May 26		7	398
	June 2		1	492

(Continued on next page.)

TABLE 57--continued.

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
standard carloads				
Two-way, 8-week overlap				
<u>1963--week ending:</u>				
June 9			97	523
June 16			54	442
June 23			34	440
June 30			16	413
July 7			14	430
July 14			7	489
July 21			7	503
July 28			2	502
No overlap, 14 weeks				
August 4				534
August 11				484
August 18				492
August 25				484
September 1				526
September 8				425
September 15				581
September 22				448
September 29				553
October 6				556
October 13				548
October 20				460
October 27				445
November 3				395
Two-way, 2-week overlap				
November 10	1			199
November 17	209			85
Three-way, 6-week overlap				
November 24	680	1		39
December 1	742	11		17
December 8	1,226	38		7
December 15	1,357	87		5
December 22	822	101		3
December 29	624	84		1
Two-way, 12-week overlap				
<u>1964--week ending:</u>				
January 5	621	118		
January 12	816	200		
January 19	862	285		
January 26	914	230		
February 2	962	377		
February 9	919	406		

(Continued on next page.)

TABLE 57--continued.

Crop year	Overlap volume			
	Central navels	Southern navels	Central valencias	Southern valencias
1964--week ending:	standard carloads			
	(Two-way, 12-week overlap--continued)			
February 16	814	433		
February 23	742	421		
March 1	793	475		
March 8	768	466		
March 15	716	605		
March 22	622	613		
Three-way, 3-week overlap				
March 29	329	422	1	
April 5	181	480	28	
April 12	58	580	279	
Four-way, 2-week overlap				
April 19	17	485	382	12
April 26	6	278	539	60
Three-way, 4-week overlap				
May 3		136	699	108
May 10		66	693	162
May 17		13	637	218
May 24		3	592	264
Two-way, 19-week overlap				
May 31			467	278
June 7			311	281
June 14			227	268
June 21			219	355
June 28			197	326
July 5			143	408
July 12			33	473
July 19			7	478
July 26			6	518
August 2			10	506
August 9			8	478
August 16			3	443
August 23			3	436
August 30			1	466
September 6			0	486
September 13			4	411
September 20			15	499
September 27			12	489
October 4			3	467
No overlap, 5 weeks				
October 11				414
October 18				357
October 25				293
November 1				185
November 8 ^a				151

a/ Start of new navel season and two-way overlap, November 15.

Source: See page 181.

TABLE 58

No Overlap of Shipments: Central and Southern Navels
and Central and Southern Valencias

Crop year	Central navels	Southern navels	Central valencias	Southern valencias
	weeks			
1945-46		2		17
1946-47				2
1947-48		1		3 ^{a/}
1948-49		4		18
1949-50				12
1950-51		1		19
1951-52				19
1952-53				17
1953-54				2 ^{a/}
1954-55				a/
1955-56				15
1956-57				1
1957-58				11
1958-59				10
1959-60				4
1960-61				13
1961-62				12
1962-63				15
1963-64				9

^{a/} There were seven additional weeks (August 21-October 2) at the end of the season during which central valencias were not shipped before a final shipment by October 9. Actually, therefore, southern valencias were shipped alone during this time. This general situation was repeated at the end of 1954 so that "no overlap" could include five additional weeks, but 1954-55 had a five-week intermission in shipments of central valencias and a resumption of two months of shipments thus technically bracketing all of southern valencia shipments in September.

Source: Developed by the authors from sources listed on page 181.

to illustrate this point. From a quick glance it is apparent that (1) the no-overlap experience is relevant to southern valencias as they are the only shipments made alone on any regular basis and (2) that there has been variation in the number of weeks of single district variety shipment, but the fluctuations are apparently not evidence of any particular trend. The stretch out which seemed to be characteristic of the mid-1950's did seem to shorten the length of time during which southern valencias were shipped without central varieties or southern navel overlap, but in only two years was the situation extreme.

Southern navels were shipped, as seen in the table, with no overlap in scattered weeks in the first postwar decade but in such small amounts that the change cannot have been very noticeable in the later decade when no weeks of this type occurred.

All of this discussion--in fact, all of this study to this point--has been conducted without acknowledgment of a third district which has experienced considerable growth in recent years and which further complicates the overlap problem and the isolation of any shipping period we have already discussed.

Arizona-Desert-Valley District Shipments: An Added Overlap

Although the Arizona-Desert-Valley (A-D-V) is not a new district, only in the 1960's has it regained some of its former importance as a center for the growing citrus industry. In the immediate postwar period, over 3,500 acres of navels and nearly as many acres of valencias were harvested annually. Production averaged somewhat less than 1,000 carloads annually of each variety. Both varieties of oranges decreased in both acreage and total production after the break between marketing orders, but the navel orange decrease was greater. It seems apparent now that there has been a rejuvenation of the orange industry in this district as acreage was removed from District II and opportunities for irrigation in the desert were expanded. Growth figures are now significant (see Table 59). Although the actual volume of both navels and valencias grown is still relatively small, it is nonetheless growing and, within the industry itself, attention has been turned to the economic impact of this area's shipments in the overlapping situation.

No attempt has been made to weave the A-D-V district history into the study for the earlier years, but a picture of the current influence of its growth can be gained from the analysis of the overlap in the last few years which may offer sufficient background for further assessment of future developments.

TABLE 59

Navel and Valencia Oranges: Arizona-Desert-Valley Production
1960-61 Through 1963-64

Crop year	Navels			Valencias		
	Production standard carloads	Harvested acreage	Yield cartons per acre	Production standard carloads	Harvested acreage	Yield cartons per acre
1960-61	491	2,895	169.6	1,502	5,721	262.5
1961-62	747	3,119	239.5	1,696	6,633	255.7
1962-63	794	3,271	242.7	1,907	7,368	258.8
1963-64	1,170	3,609	324.2	2,742	10,195	269.0

Source: Developed by the authors from sources listed on page 181.

Diagram II shows the position and timing of navel and valencia fresh shipments under regulation from all three districts for the 1962-63 and 1963-64 season. It can easily be seen from this diagrammatic presentation that solitary district-variety shipment no longer exists in actuality for California oranges, nor did it in any of the years previously noted where the A-D-V shipments were excluded. To be sure, the volume of the A-D-V shipments in any given week is not very great. The navels seem ready for shipment as early as the central navels, and the valencias seem ready to be shipped earlier than southern valencias, so that the traditional orange acreage located in District I has no exclusive advantage at any time in any season, nor does District II have the exclusive advantage of shipping earlier than southern navels with the winter orange crop.

To illustrate the overlapping shipment with greater volume detail, Tables 60 through 63 have been developed, taking the multiple analysis from two-way through five-way variation for the same two years. Although awkward to handle, the conclusions are relatively simple: central and southern valencias have a period of overlap depending on the length of the central valencia season after the A-D-V valencias are finished and in the mid-southern valencia shipping season. Southern valencia volume is appreciable at this time; the others are tail-end shipments. There is a possible two-way overlap of southern valencias and A-D-V navels at the very start of the latter's season, which is of very little significance as such. Central navels then join and there is a small volume of three-way shipment for a brief period. As soon as southern navels start shipping, the four-way overlap has somewhat more length and considerably more volume; central navels show the most sizeable shipments affected. It is also in this overlap that the A-D-V volume of navels has shown an important increase. In the three-way overlap of the valencia orange shipments from the three districts, the A-D-V valencias have also shown important increases during the overlap period.

Without belaboring this quick look at the effect of the A-D-V on the overlap problem as such, which can easily be checked through the tables offered, it is important to note that the irrigation of the new area and the reclamation of the desert thereby, if it continues, will be an important factor in the overall alignment of orange shipments for the future.

As a final note in this regard, Table 64 is a detailed presentation of fresh shipments of navels and valencias from all three districts since 1962,

DIAGRAM II

Pattern of Overlapping Navel and Valencia Shipments: Central, Southern, and Arizona-Desert-Valley Districts
1962-63 and 1963-64

	Weekly shipments ^{a/}																																																			
	November																										October																									
<u>1962-63</u>																																																				
Central navels	x x																																																			
Central valencias																											- -																									
Southern navels	o o																																																			
Southern valencias	. .																																																			

^{a/} Weekly shipments are indicated by the following symbols: x, central navels; -, central valencias; o, southern navels; ., southern valencias; =, Arizona-Desert-Valley navels; and *, Arizona-Desert-Valley valencias.

First shipment in November; the start of navel shipments is considered the beginning of each annual season.

^{b/} Continues into the following year, 1964-65.

Source: Developed by the authors from sources listed on page 181.

TABLE 60

Two-Way Navel and Valencia Shipments: Central, Southern, and
Arizona-Desert-Valley Districts, 1962-63 and 1963-64

Crop year	Overlap dates ^{a/}			Overlap volume	
	From	To	Number of weeks	Central valencias	Southern valencias
1962-63 1963-64	July 7, 1963 July 12, 1964	July 28, 1963 October 4, 1964	4 13	standard carloads	
				30 105	1,924 6,150
				Southern valencias	A-D-V navels
1962-63 1963-64	November 4, 1962	--	1	309	1
	--	--	0	0	0

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 61

Three-Way Navel and Valencia Shipments: Central, Southern, and
Arizona-Desert-Valley Districts, 1962-63 and 1963-64

Crop year	Overlap dates ^{a/}			Overlap volume		
	From	To	Number of weeks	Central navels	Southern valencias	A-D-V navels
				standard carloads		
1962-63	November 11, 1962	November 18, 1962	2	343	404	13
1963-64	November 10, 1963	November 17, 1963	2	210	284	50
				Central navels	Southern navels	A-D-V navels
1962-63	December 2, 1962	January 13, 1963	3	1,701	370	148
1963-64	January 5, 1964	--	1	621	118	85
				Central navels	Southern navels	A-D-V valencias
1962-63	March 3, 1963	March 24, 1963	4	127	2,236	276
1963-64	March 8, 1964	March 22, 1964	3	2,106	1,684	195
				Central valencias	Southern valencias	A-D-V valencias
1962-63	June 9, 1963	June 30, 1963	4	201	1,818	19
1963-64	May 31, 1964	July 5, 1964	6	1,564	1,916	179

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 62

Four-Way Navel and Valencia Shipments: Central, Southern, and
Arizona-Desert-Valley Districts, 1962-63 and 1963-64

Crop year	Overlap dates ^{a/}			Overlap volume			
	From	To	Number of weeks	Central navels	Southern navels	Southern valencias	A-D-V navels
1962-63 1963-64	November 25, 1962 November 24, 1963	December 23, 1962 December 29, 1963	5 6	standard carloads			
				4,708	222	95	440
				5,451	322	72	770
				Central navels	Southern navels	A-D-V navels	A-D-V valencias
1962-63 1963-64	January 20, 1963 January 12, 1964	February 24, 1963 March 1, 1964	6 8	2,348	1,852	77	60
				6,822	2,827	117	178
				Central navels	Southern navels	Southern valencias	A-D-V valencias
1962-63 1963-64	March 31, 1963 --	April 14, 1963 --	3 0	40	1,474	24	280
				0	0	0	0
				Central navels	Southern navels	Central valencias	A-D-V valencias
1962-63 1963-64	-- March 29, 1964	-- April 12, 1964	0 3	0	0	0	0
				568	1,482	308	491
				Southern navels	Central valencias	Southern valencias	A-D-V valencias
1962-63 1963-64	May 5, 1963 May 3, 1964	June 2, 1963 May 24, 1964	5 4	333	1,634	1,620	126
				218	2,621	752	532

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 63

Five-Way Navel and Valencia Shipments: Central, Southern, and
Arizona-Desert-Valley Districts, 1962-63 and 1963-64

Crop year	Overlap dates ^{a/}			Overlap volume				
	From	To	Number of weeks	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V valencias
1962-63	April 21, 1963	April 28, 1963	2	6	707	149	81	171
1963-64	April 19, 1964	April 26, 1964	2	23	763	921	72	416

^{a/} Shipments are quoted by date of end of week, Sunday, 12:01 a.m.

Source: Developed by the authors from sources listed on page 181.

TABLE 64

Detail of Navel and Valencia Shipments: Central, Southern, and Arizona-Desert-Valley Districts
1962-63 and 1963-64

Crop year	Overlap volume					
	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V navels	A-D-V valencias
standard carloads						
Two-way, 1-week overlap						
<u>1962--week ending:</u>						
November 4				309	1	
Three-way, 2-week overlap						
November 11	13			229	2	
November 18	310			175	11	
Four-way, 5-week overlap						
November 25	568	2		58	28	
December 2	834	10		13	73	
December 9	1,297	39		13	104	
December 16	1,186	82		3	137	
December 23	823	89		8	98	
Three-way, 3-week overlap						
December 30	484	74			47	
<u>1963--week ending:</u>						
January 6	576	107			50	
January 13	641	189			51	
Four-way, 6-week overlap						
January 20	748	215			44	6
January 27	626	325			17	1
February 3	368	276			11	5
February 10	333	277			2	7
February 17	152	298			2	7
February 24	121	461			1	34

(Continued on next page.)

TABLE 64--continued.

Crop year	Overlap volume					
	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V navels	A-D-V valencias
standard carloads						
Three-way, 4-week overlap						
1963--week ending:						
March 3	90	554				38
March 10	24	598				68
March 17	2	553				77
March 24	11	531				93
Four-way, 3-week overlap						
March 31	19	475		3		92
April 7	16	535		10		93
April 14	5	464		11		95
Five-way, 2-week overlap						
April 21	4	376	17	26		96
April 28	2	331	132	55		75
Four-way, 5-week overlap						
May 5		207	320	147		44
May 12		88	425	234		37
May 19		30	370	349		26
May 26		7	326	398		14
June 2		1	193	492		5
Three-way, 4-week overlap						
June 9			97	523		3
June 16			54	442		9
June 23			34	440		5
June 30			16	413		2
Two-way, 4-week overlap						
July 7			14	430		
July 14			7	489		
July 21			7	503		
July 28			2	502		

(Continued on next page.)

TABLE 64--continued.

Crop year	Overlap volume					
	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V navels	A-D-V valencias
standard carloads						
No overlap, 14 weeks						
<u>1963--week ending:</u>						
August 4				534		
August 11				484		
August 18				492		
August 25				484		
September 1				526		
September 8				425		
September 15				581		
September 22				448		
September 29				553		
October 6				556		
October 13				548		
October 20				460		
October 27				445		
November 3				395		
Three-way, 2-week overlap						
November 10	1			199	5	
November 17	209			85	45	
Four-way, 6-week overlap						
November 24	680	1		39	83	
December 1	742	11		17	114	
December 8	1,226	38		7	156	
December 15	1,357	87		5	207	
December 22	822	101		3	139	
December 29	624	84		1	71	
Three-way, 1-week overlap						
<u>1964--week ending:</u>						
January 5	621	118			85	

(Continued on next page.)

TABLE 64--continued.

Crop year	Overlap volume					
	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V navels	A-D-V valencias
<u>1964--week ending:</u>	standard carloads					
	Four-way, 8-week overlap					
January 12	816	200			66	2
January 19	862	285			38	6
January 26	914	230			7	4
February 2	962	377			3	7
February 9	919	406			2	19
February 16	814	433			0	46
February 23	742	421			0	59
March 1	793	475			1	35
March 8 March 15 March 22	Three-way, 3-week overlap					
	768	466				47
	716	605				51
March 29 April 5 April 12	Four-way, 3-week overlap					
	329	422	1			107
	181	480	28			168
April 19 April 26	Five-way, 2-week overlap					
	17	485	382	12		213
	6	278	539	60		203
May 3 May 10 May 17 May 24	Four-way, 4-week overlap					
		136	699	108		185
		66	693	162		156
		13	637	218		118
		3	592	264		73

(Continued on next page.)

TABLE 64--continued.

Crop year	Overlap volume					
	Central navels	Southern navels	Central valencias	Southern valencias	A-D-V navels	A-D-V valencias
<u>1964--week ending:</u>	standard carloads					
	Three-way, 6-week overlap					
May 31 ⁻			467	278		61
June 7			311	281		54
June 14			227	268		29
June 21			219	355		26
June 28			197	326		8
July 5			143	408		1
	Two-way, 13-week overlap					
July 12			33	473		
July 19			7	478		
July 26			6	518		
August 2			10	506		
August 9			8	478		
August 16			3	443		
August 23			3	436		
August 30			1	466		
September 6			0	486		
September 13			4	411		
September 20			15	499		
September 27			12	489		
October 4			3	467		
	No overlap, 5 weeks					
October 11				414		
October 18				357		
October 25				293		
November 1 ^{a/}				185		
November 8 ^{a/}				151		

^{a/} Start of new navel season (Central and Arizona-Desert-Valley) and three-way overlap, November 15.

Source: Developed by the authors from sources listed on page 181.

and it extends Table 57 by showing in detail the four-way overlap due to A-D-V fresh shipments. No further indication need be offered of the complications of adjustment of fresh shipments between districts and varieties.

The Overlap Problem

Contrary to popular misconceptions, California orange production is not precisely divided between the central and southern districts of the state with each having a fixed and unchanging share of either production or the available market. Nor is the year divided in such a way that the district crops mature in such a manner that they have an unchallenged or noncompetitive opportunity to ship. No single variety in either of the districts has a monopoly in the shipment of its complete crop. Traditionally, the navels have been viewed as winter oranges, coming into maturity and being ready for sale about November and continuing to approximately March; then, the valencias were traditionally viewed as ready to take over the rest of the year. If there were two areas, each growing just one variety, it would still probably be true that the last of the harvested valencias would be for sale in the market during the first few months of the "new" navel crop--that is, from November through January. But, as a matter of fact, both the central and southern districts are major sources for navels and valencias, which is in contrast to the situation in the prewar or immediate postwar years. Whereas the production in the southern district has been traditionally dominant in both varieties of oranges, the fact that navels are now grown in substantial volume in both the central and southern districts, that valencias are also grown in both areas, and the additional fact that the district varieties are not harvested and marketed in quite the same months in the two different latitudes, has resulted in a very complicated version of what is called the overlap problem. This picture has become more "clouded" by the decline in production in the southern district as a whole, the increasing importance of the central California share of fresh shipments, and the lengthening of the season for each district and each variety and particularly in central navels. As a consequence, the overlap problem has extended to a year-round phenomenon. The additional complication of the growth of the A-D-V district growing both varieties of orange has also been noted.

The preceding analyses clearly indicate that the overlap problem is not a fixed, static, or unchanging one. Each year has its own unique overlap characteristics. What is apparent, however, is the growing tendency in the more

recent years toward intensification of overlapping shipments. If such overlapping reflected only interaction of shipping schedules with no other effects, the simultaneous shipment of different varieties or from different districts would be of little significance. But what occurs may involve economic marketing consequences. Not only is the planning of shipments complicated, but some shippers are of the view that their weekly and seasonal prices and returns are affected.

This study has outlined in considerable detail the overlap problem as such, with a descriptive discussion and tabular presentation of the definition and dimensions of overlapping shipments existing under the current regulation authorized by the marketing orders for navel and valencia oranges in California. Changes inherent in the introduction of the two marketing orders in 1953-54 have been observed and analyzed, and subsequent developments have been charted carefully. Thus, this study has followed the development of the district shipments through all phases of single and multiple shipping since World War II. What it has not done as yet is to establish the economic relevance of this overlapping in price terms.

Further testing is currently planned by the present authors, and if it can be demonstrated that there are indeed price effects produced by more or less overlapping of shipments, then the gathering together of this data, although interesting in and of itself, will assume more than the aspects of careful descriptive measurement and may chart the possible anticipated economic effects of the control of shipments between districts from past thoroughly documented experience.

CULTURAL COSTS OF ORANGE PRODUCTION IN CALIFORNIA

Nature of the Cost Data

One of the more significant indicators of the comparative economic positions of central and southern California oranges is the differential behavior of their cultural costs. But regardless of the importance of costs in affecting net returns received by growers, adequately detailed and reliable data are hard to locate in order to compare relative costs in the central and southern districts.

The only generally available data on costs of producing and marketing California oranges are the figures in the reports issued by the California Citrus League. If not strictly comparable from year to year, the Citrus League cost data have been published for a substantial period of time. Although such cost data go back almost a third of a century, we are concerned here only in the cost trends for the postwar years and particularly the past several years.

It must be recognized that the Citrus League cost data are not presumed to be representative of the industry. The data reflect the experience of a limited number of cooperating growers rather than an unbiased probability sample of orchards. Furthermore, there is no basis for determining the extent to which the data represent sampling variation in contrast with actual variation in costs of different growers or the same growers over time. Thus, from the view of sampling alone, the adequacy and reliability of the Citrus League cost data are open to question as being representative of industry cost experience.

These limitations apply particularly to the producing or cultural costs (those up to but not including picking of the fruit). But it is the comparative cultural costs in the southern and central districts in which we are especially interested. The marketing costs can be viewed as being more reliable and representative but, since they are not considered to differ between the two districts, the marketing costs are not helpful in discerning the differential costs between southern and central oranges. Hence, it is necessary to fall back on the data available for cultural or producing costs.

Recognizing the limitation of the Citrus League cultural cost data, they may nevertheless be useful in some ways. Their availability is fortunate, in

fact, for without them no continuous series would be at hand. Thus, with cautious interpretation, such cost data are used here as suggestive of the direction of change in the year-to-year cultural costs and as indicative of the prevailing broad tendencies in the cultural cost situation in the orange growing industry. On that basis, rather than viewing the data as precise cost measures, we review the trends in the comparative costs considered below.

Navel and Valencia Cultural Costs Compared

When considering cultural cost comparisons between navel and valencia oranges, it is necessary to use Citrus League data for the state as a whole. These data are shown as cultural costs per acre for the years beginning with 1944-45 for California (see Table 65). In this way one may note the tendency for the annual cost-per-acre data for both navels and valencias to vary around a rather flat trend until 1952-53. Up to that time, some of the valencia per-acre costs were above and some below the navel costs per acre. Out of the nine years from 1944-45 to 1952-53, the valencia per-acre costs were higher for five of the years, the navel per-acre costs were higher for two years, and for the remaining two of the nine years, the navel and valencia per-acre costs were about the same. But, by 1954-55 a marked change occurred. For navels and valencias both, the per-acre cultural costs advanced sharply. Not only were the per-acre cultural costs much higher than in the previous years, but the valencia costs substantially exceeded those of the navels. The change is great enough to suggest the possibility of differing techniques of recording costs or gathering data after 1954.

From this change onward, the cultural cost per acre as recorded generally increases annually for both varieties of oranges with few exceptions. In general, also, valencia oranges are recorded at a higher cultural cost per acre than navel oranges. By 1963, navel oranges are said to cost \$475 per acre on the tree and valencias, \$505 per acre. When the navel and valencia cultural costs per carton equivalent are examined, a picture emerges which is different in some respects from that of the per-acre costs (see Table 66). First may be noted that, over the postwar period as a whole, the navel costs per box have fluctuated somewhat more widely than those of valencias, although the difference in variability may not be really significant.

TABLE 65

Orange Production: Cultural Costs Per Acre, By Variety

Crop year	Navel	Valencia dollars	All oranges
1944-45	276.10	257.12	266.25
1945-46	288.47	271.43	279.42
1946-47	273.60	279.50	276.72
1947-48	254.75	268.38	261.77
1948-49	267.11	289.21	277.55
1949-50	252.02	267.50	259.58
1950-51	265.21	266.63	265.95
1951-52	247.96	261.17	254.51
1952-53	287.21	286.29	286.64
1953-54	295.29	276.29	285.87
1954-55	351.83	400.37	381.63
1955-56	364.74	394.86	383.03
1956-57	390.12	426.63	412.18
1957-58	386.10	401.22	395.23
1958-59	431.61	449.89	442.36
1959-60	452.00	443.67	447.14
1960-61	432.47	505.55	474.10
1961-62	445.93	499.11	475.50
1962-63	475.00	505.00	489.00

Source: See page 181.

TABLE 66

Orange Production: Cultural Costs Per Carton, By Variety

Crop year	Navel	Valencia	All oranges
	dollars		
1944-45	.48	.39	.40
1945-46	.57	.67	.62
1946-47	.52	.50	.51
1947-48	.49	.63	.57
1948-49	.82	.65	.68
1949-50	.52	.56	.54
1950-51	.62	.49	.53
1951-52	.69	.52	.57
1952-53	.49	.43	.46
1953-54	.59	.65	.62
1954-55	.62	.68	.66
1955-56	.62	.64	.64
1956-57	.66	.67	.67
1957-58	.93	.89	.91
1958-59	.82	.78	.80
1959-60	1.01	.98	1.00
1960-61	1.33	1.05	1.17
1961-62	1.45	1.29	1.37
1962-63	.90	.84	.87

Source: Developed by the authors from records of the California-Arizona Citrus League. See page 181.

No persistent pattern seems to have prevailed as shown by the data on hand; the two varieties shifted position on cost per carton in an irregular fashion until roughly 1956-57, at which time the navel and valencia cost per carton seemed almost equal. However, in the six years recorded since then, navel cultural cost per carton has exceeded valencia cost as both increased. And in the two years of the six, when decreases are noted (1959 and 1963), navel costs are still above those attributed to valencia oranges. For both valencias and navels, on a statewide basis, there did not appear to be a persistent trend upward or downward in the cost per carton equivalent for the decade immediately after the war. For several years of the mid-1950's, the observed costs seemed relatively stable, but those recorded since 1958 have fluctuated widely in a rising direction. The very sizable cost "break" recorded in 1963 seems difficult to explain, unless again it is attributed to the methods used in gathering data. The 1963-64 figures have not been quoted because of changes made in tabulating data, and it may well be that the previous year is not entirely comparable either.

District Cultural Costs Compared

With the preceding comments on statewide differential behavior of navel and valencia cultural costs per acre and per-carton equivalent, cultural costs are now examined from another view. Cultural cost situations in the separate central and southern districts are now compared so far as possible. It would be desirable to differentiate between the navel and valencia varieties in the two districts, but the data at hand do not permit such an analysis. The county cost data, on which the district data are based, reflect a combination of the navel and valencia varieties. Hence, when considering the central and southern districts separately, it is necessary to deal with oranges as such, reflecting the mixture of navels and valencias that prevailed in the respective years.

Another limitation of the district data on cultural costs pertains to their geographical coverage. The only cost data for the central district are those for Tulare County. In earlier years, it is very probable that Tulare County represented the central district. But in recent years, orange production has become important in other counties in the central district. Yet, we are limited to Tulare as a proxy for the cultural cost situation in the

central district because other data are not at hand, and of course it is true that it is still the most important single county in District I.

To represent the southern district, the cultural cost data of four counties--Orange, Los Angeles, Ventura, and San Diego--are used. Such data were combined using relative weights as contained in the Citrus League reports giving detail on the surveys made by the Citrus League. In view of the prominence of those four counties in the southern district, there are grounds for the view that the derived costs for the southern district are reasonably acceptable within the overall limitations of the data.

Recognizing the qualifications about the cultural cost data for the central and southern districts, the annual data are shown in Table 67. Both the per-acre and per-carton equivalent cultural costs are shown through 1962. Because of recent changes in data collection, more recent years cannot be included at this time.

When the per-acre cultural costs are examined, there are noticeable differences between the southern (four counties) and the central (Tulare) districts. An upward trend of four years after the war was followed by some decreases for three years, but fluctuations thereafter were at higher levels throughout the remaining 1950's. The years of 1961 and 1962 have shown strong upward trending costs.

Per-acre cultural costs in the central district show a different picture. There was a downward trend from 1944-45 to 1951-52. After that year, as in the southern district, per-acre cultural costs trended upward sharply and persistently through the 1950's. The 1961 and 1962 figures, however, are much lower. The problems connected with data collection must be kept in mind in this connection. The estimated figure for 1963 (not included because of incomparability to other county figures) shows "central" cultural cost per acre to be \$428, a much closer figure to that derived for the "southern" district in the previous year.

It may be of interest to observe at this point the recent experience of Riverside County for which the data are given in Table 68. The information contained in this table is similar to that in Table 67 though somewhat more detailed, since there is a breakdown by citrus varieties which is not available for the other counties listed. Only the District II portion of Riverside County has been included in this listing; the area is of interest in this

TABLE 67

Orange Production: Cultural Costs Per Acre and Per Carton
Central and Southern Districts

Crop year	Central ^{a/}		Southern ^{a/}	
	Cost per acre	Cost per carton	Cost per acre	Cost per carton
	dollars			
1945-46	281.18	.67	263.74	.63
1946-47	261.95	.51	276.56	.61
1947-48	239.18	.54	274.09	.54
1948-49	259.57	.85	298.68	.58
1949-50	215.33	.66	293.24	.52
1950-51	224.75	.63	286.08	.48
1951-52	214.93	.62	280.24	.49
1952-53	262.88	.42	328.41	.45
1953-54	279.00	.48	306.25	.65
1954-55	307.47	.41	374.67	.59
1955-56	333.14	.52	373.56	.62
1956-57	357.16	.52	402.02	.62
1957-58	368.90	.72	378.93	.86
1958-59	382.86	.48	399.65	.63
1959-60	411.41	.68	397.79	.78
1960-61	341.99	1.20	433.57	.86
1961-62	349.02	1.59	459.36	.94

^{a/} Central: Tulare County only. Southern: Los Angeles, Orange, San Diego, and Ventura Counties only.

Source: Developed by the authors from records of the California-Arizona Citrus League. See page 181.

TABLE 68

Orange Production: Cultural Costs Per Acre and Per Carton in District II
Riverside County Portion, By Variety, 1956-57 Through 1962-63

Crop year	Navels	Valencias	All oranges	Navels	Valencias	All oranges
	dollars per acre			dollars per carton		
1956-57	367.32	364.06	345.44	0.68	0.80	0.66
1957-58	455.40	466.16	459.54	1.64	1.26	1.47
1958-59	356.96	488.14	403.53	0.65	0.82	0.72
1959-60	360.91	395.71	373.16	1.13	1.25	1.17
1960-61	453.10	476.36	462.13	1.15	0.86	1.01
1961-62	457.92	487.25	468.54	1.15	1.47	1.25
1962-63	497.00	a/	497.00	0.88		0.88

a/ Blanks indicate no data available.

Source: Private industry data.

connection particularly because of the growth characteristics during the period of decreasing acreage and production elsewhere in the southern district.

A comparison of the cost per acre noted for Riverside County with the rest of its district indicates that, based on the estimates quoted, most of the years' quotations are higher for Riverside County. This is true of the per-carton costs also. The data seem to be collected in the same general manner as quotations made in earlier tables. Based on this small and imperfect sample, one could scarcely justify the increase in citrus growing in Riverside County. It is, of course, scarcely necessary to add that the acreage increase in the area is for other reasons altogether than those of immediate lower cultural costs.

The figures quoted for the southern district cultural costs per bearing acre have been consistently less favorable than those in the central district. Both districts have some characteristics in common, such as the increased costs in 1948-49 (the bad frost year) and a sharp upward trend in costs after 1951-52. But there is a significant and generally prevailing difference; southern cultural costs per acre have been persistently higher than those in the central district. This generalization applies, as noted earlier, to the navel and valencia varieties combined in each of the two districts.

When the central and southern cultural costs-per-carton equivalent are reviewed, a still different picture is seen. Considerable similarity in direction of change in the annual cost data of the two districts is noticeable, but different trend patterns over time prevail.

The central cultural costs per carton have tended to fluctuate somewhat more than those of the southern district over the entire period. The three "peak years" recorded for the central district are all attributable to special climatic emergencies, but it is difficult to distinguish any trend in the nonemergency years. A downward trend can be noted after the bad frost year of 1948-49, but fluctuations thereafter give no particularly helpful indications. The counties which are covered as southern in our observation record no peaks as in Tulare County. It is possible to note a general downward trend through 1953 and, following this, a more or less upward trend of costs in the last decade. When comparisons are noted between the counties of the two districts, however, it is true--as in the case of cost per bearing acre--that over the last decade--excluding the short crop years in the central district--costs per carton have tended to be higher in the southern district.

Thus, in terms of both per-acre and per-carton equivalent, cultural costs in the southern district have been substantially higher than in the central district, excluding the abnormal weather years. Whether this reflects the newer, younger acreage experience or will change with further shifts in production cannot now be stated. It is clear, however, that for the period as a whole, based on quite tentative data, central district growers apparently have been more favorably situated with respect to cost structure experience than have been the southern district growers.

COMPARATIVE POSTWAR DEVELOPMENTS IN ORANGE PRODUCTION IN CALIFORNIA
CENTRAL AND SOUTHERN DISTRICTS: A SUMMARY

This study has discussed orange production in California with very special reference to a comparison of the conditions under which production takes place in the two prominent orange growing sections of the state. In comparing these two areas, the boundaries and the terminology of the present federal marketing order which regulates fresh shipments of oranges have been used. In descriptive and statistical terms, the conditions under which navel and valencia oranges have been grown in the two major districts since World War II have been reviewed. Wherever possible, the production of navel and valencia oranges has been discussed separately in the two important California areas-- District I, central, and District II, southern. A very brief look was taken at District III, Arizona-Desert-Valley, with special reference to the problem of overlapping shipments. But, before summarizing the developments in and prospects for the two major sections of California's orange growing industry, it may be helpful to review briefly the decade just past for the California-Arizona orange growing area as a whole to see what the overall growth patterns and utilization characteristics have been. To do this, Table 69 has been compiled covering the two varieties.

In examining this table for navel and valencia production for the region as a whole, it is possible to form a perspective for the central and southern districts on which the study has focused. Two rather striking generalizations are immediately apparent: Despite fluctuations over the 10-year period, total production at the end of the decade remains very much the same as at the first of the decade for both varieties; and on the average, valencia production was about 15 percent larger than navel production. Over 80 percent of navel production over the decade has been allocated to fresh shipments; valencias average nearly 50 percent to this use. In processing, of course, the contrast in the utilization of the two varieties is most noticeable. From 35 to 40 percent of all valencias, on the average, have gone to processing during the decade under the two marketing orders. In navel oranges, about half this proportion is channeled to processing. In exports, the valencia orange is also a higher volume crop than the navel orange. Around 5 percent of the California navels are exported outside the northern hemisphere, while over 10 percent of the California valencia production goes into export channels.

TABLE 69

Navel and Valencia Oranges: California-Arizona Production and Utilization
1953-54 Through 1963-64

Crop year	Total production standard carloads	Utilization		
		Regulated fresh shipments	Exports	Processed and other
		percent		
		Navels		
1953-54	28,813	77	6	17
1954-55	30,679	78	6	16
1955-56	30,042	83	4	13
1956-57	30,606	81	6	13
1957-58	17,972	91	3	6
1958-59	32,998	82	4	14
1959-60	26,519	82	4	14
1960-61	17,915	89	4	7
1961-62	15,296	86	3	11
1962-63	25,035	69	3	28
1963-64	30,761	79	4	17
		Valencias		
1953-54	36,806	60	13	27
1954-55	49,150	51	11	38
1955-56	47,491	44	19	37
1956-57	42,250	51	14	35
1957-58	29,364	71	8	21
1958-59	47,038	53	10	37
1959-60	36,483	55	9	36
1960-61	33,288	56	13	31
1961-62	27,621	53	14	33
1962-63	34,088	46	10	44
1963-64	35,504	50	10	40

Source: See page 181.

Turning from this very general background for the two orange varieties in the total California-Arizona production area, we summarize briefly the major differences and parallel or contrasting trends in the two major districts which have become evident in our discussion thus far. In so doing, we will find it meaningful to compare the districts first in terms of navel orange production, then valencia orange production, and finally in overall terms.

Navel Orange Production: District Comparison

Since production of oranges involves an interaction of bearing acreage and yield, our discussion on production and utilization of navel oranges centered on the developments in these two areas and trends which had emerged since 1945-46 in total production of navel oranges in each district.^{1/} An analysis of the statistical data available shows that, in general terms, bearing acreage of navel oranges in the central district (which had remained almost stable through 1957) indicated, in the steadily increasing harvested acreage during the past five or six years, the effect of new plantings and increases in nonbearing acreage. Since navel nonbearing acreage is currently increasing, it is safe to assume that the trend of the past five years will continue, though possibly at a somewhat slower rate (see Table 70).

Since comparable "pull out" data are not immediately available, it should be remembered that the rate of increase cannot be absolutely charted from new planting alone. Spatial and climatic limitations are bound to make themselves felt in the long run; and urban growth in the area of the central district, already experienced in the southern district, may have an impact in the not-too-distant future.

Although harvested navel orange acreage in central California was shown to be relatively stable at a level of approximately 29,500 acres for the post-war decade, the upward trend in acreage has been steady since 1958. It is clear that bearing acreage has now increased by 50 percent over the 1945-46 figure and nonbearing acreage has almost doubled since 1958, even though 1962 and 1963 were at about the same level.

^{1/} Supra, pp. 12.

TABLE 70

Navel Oranges: Bearing and Nonbearing Acreage
Central District, 1958-1964

Year ending December 1	Acreage		
	Bearing	Nonbearing	Total
1958	31,000	6,657	37,657
1959	32,400	5,688	38,088
1960	33,396	7,672	41,068
1961	35,335	9,535	44,870
1962	37,402	11,265	48,667
1963	39,793	11,397	51,190
1964	44,250	13,046	57,296
Acres harvested, 1945-46			
	29,317		

Source: Developed by the authors from mimeographed bulletins from the administrative committees. See page 181.

In an earlier version of this study, estimates of nonbearing acreage and new plantings in central California were made on the basis of meager evidence and considerable personal survey by the authors. Since that time, however, more comprehensive data have been made available, and additional years of production have borne out earlier impressions of potential growth in the central district.

It was suggested then that the nonbearing acreage data by themselves were not fully indicative of the relative potential of new productive capacities, particularly in the central district. This is essentially because of the widely prevalent practice in recent years of planting more trees per acre than had been the general practice. In southern California the number of orange trees planted per acre generally was 88-90 trees. The same practice applied to central California in prewar and early postwar years. But, in the more recent period, a considerable number of plantings in central California included more than 90 trees per acre and in some areas as many as or more than 125 trees per acre. For example, new plantings in 1957 showed an average navel tree count per acre of 104; in 1958 an even larger number of acres planted in the area averaged 127 trees per acre of navel oranges. Such denser planting, of course, affects and is reflected in yield per bearing acre when the trees become productive. Thus, recently planted nonbearing acres in central California may well reflect a larger potential productive capacity than just a notation of the acreage alone.

In the southern district, bearing acreage of navel oranges has shown a definite and impressive downward trend to a point that is over 40 percent below the level of 1945-46 (see Table 71). Not only has the decrease in bearing acreage been most striking, but it also has been steady except for the slight recovery from the severe freeze of 1948-49. Bearing acreage in the southern district decreased from an estimated 56,600 acres in 1945-46 to near 35,000 acres 10 years later. However, the average decrease has not been at quite such a rapid rate in the more recent past, and nonbearing acreage in navel oranges in southern California has shown a slight upward trend at intervals since the mid-1950's.

Although small fluctuating increases in nonbearing acreage can be seen in the southern navel acreage (new plantings are mainly in Riverside County), they are scarcely enough to do other than retard the speed of the downward trend in navel acreage in the southern area.

TABLE 71

Navel Oranges: Bearing and Nonbearing Acreage
Southern District, 1958-1964

Year ending December 1	Acreage		
	Bearing	Nonbearing	Total
1958	31,226	1,603	32,829
1959	29,800	1,582	31,382
1960	29,200	1,856	31,056
1961	27,664	1,316	28,980
1962	26,610	2,025	28,635
1963	26,136	1,765	27,901
1964	25,460	2,065	27,525
Acres harvested, 1945-46			
	56,613		

Source: Developed by the authors from mimeographed bulletins from the administrative committees. See page 181.

A second point meriting consideration is that, in view of the differential yield experience in the southern and central districts and aside from the influence of the differing number of trees per acre, the nonbearing acreages in the two districts are probably not strictly comparable. Due to soils, water, climatic conditions, and particularly various types of entomological, parasitical, and virus influences affecting the yield conditions of the trees--factors which vary between the two districts--their bearing as well as non-bearing acreages are not infallible indicators of comparative productive capacities. But, despite such qualifications, the evidence suggests reasonably clearly that the growth in productive capacity has occurred in the central more strongly than in the southern district.

It is perfectly true that this generalization could have been made more emphatically several years ago before the central district had experienced any difficulties in its relatively new acreage which has by now seen at least two short crop years, in large part caused by wind and frost. Production difficulties also arose in the central district, caused by shortage of nursery stock and certain inferior and sour fruit from some of the newly planted acreage when it did come into bearing age. These particular difficulties now seem to have been overcome.

When combining trends in bearing acreage with those of yield per acre in navel oranges in order to assess total production trends, it seems clear that yield trends in the central district, while on the average not as striking as in the mid-1950's, are still impressive. Southern yield trends, on the other hand, are fluctuating with a tendency to smaller decreases than in the mid-1950's but are unable to counteract the steady downward trend in acreage. This, therefore, proposes the strong likelihood of continuing increases in production of the central district navel oranges and the possibility that navel production in the southern district may level off rather than continue the small increase noted in the past two seasons.

To summarize the district comparisons of navel oranges, the central district undoubtedly will continue to exceed the southern district in total production of navel oranges in the near future as it has done in the recent past. This situation is the result of first stable, then increasing, bearing acreage coupled with noticeably increased yield in the central district paralleled by a steady downward trend in acreage in the southern district only partially

offset in recent years by a slight increase in yield per acre in the smaller acreage which remained.

District Utilization of Navels

Although the question of varying utilization of navel oranges has been touched on already, it is convenient here to remember the differing trends we have discussed in detail in the two districts. A tendency was noted toward a larger percentage of production to be shipped fresh in the central district than in the southern district. This is further explained when we draw on the data on size distribution and recall that navel oranges in the central district tend, in general, to be in the somewhat larger size categories than those of the southern district. This, in turn, means that a larger proportion of the southern navel oranges over the postwar time period has gone into processing, which brings somewhat lower returns to growers and also indicates, in general, smaller, less acceptable sizes of fresh shipment available in the southern district.

As navel production in the central district equals and then exceeds that of the southern district, these utilization patterns take on an even greater absolute significance in terms of grower returns, allocation, and future trends in marketing navel oranges from both districts. To this may be added the very tentative findings on cultural costs of growing navel oranges in the central district in which it appears that the growers in the central district have had an additional advantage of lower cultural costs, both per acre and per carton, than those in the southern district. These findings seem to indicate that for many reasons in various combinations, all of which have not necessarily been enumerated, navel growers in the central district currently enjoy a more favorable position than those in the southern district.

Pattern and Overlapping of District Navel Shipments

In tracing the influence of the length of season and pattern of overlapping shipments, a discernible tendency of the 1950's for a longer central navel season, occasionally but not always longer than that of the southern district, was experienced in the postwar years. Both this elongation and the longer overlapping of southern shipments by central navel oranges seems

somewhat modified in the past few years. Yet, growth characteristics exhibited by the central district, in navel oranges particularly, have perforce brought changes in volume of overlapping shipments, even though careful investigation over the longer span does not indicate great change in the pattern of within-season, regulated shipments as such. The only generalization possible here seems to be that southern navel shipments have remained unusually stable over the 20 years, while the central shipments have changed somewhat.

An earlier hypothesis, therefore, that overlapping shipments may have developed slightly to the advantage of central district growers seems not, in and of itself, to be borne out by the facts over the longer run. Overlapping shipments do exist and are more extensive in time and volume than had been true in earlier years, but the tendency to continue shipping the last 10 percent of the central navel crop over a longer period of time seems not to be continuing. The conclusion that can be drawn is that southern navel oranges seem to be shipped and thus overlap in very much the same pattern and distribution through the two decades; any changes exhibited have been those of central navels, and these have tended toward some elongation and some shift of shipments toward the end of the season, but this was more true of the period from 1954 through 1960 than it has been since.

These conclusions are strengthened by the valencia district experience which will be discussed in the next section.

Valencia Orange Production: District Comparison

In the production of valencia oranges, the southern district has been of dominant importance in California, considerably more so than has ever been true in the growing of navel oranges. In comparing trends of the two producing districts since World War II, there is a distinct downward trend in bearing acreage of valencias in the southern district (see Table 72). Steadily and without exception, annual decreases in acreage have brought about a greater than 50 percent reduction in bearing acreage since 1945-46 in the south. The pace of this decrease has been relentless over the past decade, even though not quite as rapid in the last two years.

The important observation for anticipation of future developments is the increase in nonbearing acreage since 1957. Even though the steady rise in nonbearing acreage has done no more than retard the bearing acreage decreases

TABLE 72

Valencia Oranges: Bearing and Nonbearing Acreage
Southern District, 1958-1964

Year ending December 1	Acreage		
	Bearing	Nonbearing	Total
1958	72,123	1,185	73,308
1959	73,000	1,557	74,557
1960	70,000	2,715	72,715
1961	65,364	3,194	68,558
1962	61,807	3,862	65,669
1963	58,051	5,387	63,438
1964	56,357	7,769	64,126
Acres harvested, 1945-46			
	137,087		

Source: Developed by the authors from mimeographed bulletins from the administrative committees. See page 181.

so far, there may be a further stabilizing effect in the near future as the newly planted acreage, such as in Riverside County and the Coachella Valley, becomes ready for harvest. In concentrating on the shift of acreage to the San Joaquin Valley as urban development took over the southern California acreage, it is sometimes forgotten that additional southern acreage has also been located, accompanied by extensive new irrigation.

The growth of the Arizona-Desert-Valley citrus industry in both navel and valencia oranges, although not covered in any depth in this study, very possibly may modify in a measurable fashion the shift of the center of the citrus industry to central California which has characterized the past two decades. The acreage and production figures for District III are not presently large but are showing strong growth trends. The restraining factor, of course, is comparative yield. Arizona-Desert-Valley yield is as yet a fraction of that shown by central navels and valencias.

Even with the decrease indicated in the earlier postwar years, the southern district had at one time over six times the total acreage in valencia oranges credited to the central district. During the last seven or eight years, this ratio has altered substantially, despite the increases in nonbearing acreage in the south noted above.

The central district, while not showing quite such substantial increases in nonbearing acreage of valencias as those in the southern district, nonetheless has shown steady increases in bearing acreage, indicating that there has been very little pulling out of acreage and a steady shift of nonbearing to bearing acreage throughout the period (see Table 73).

The combined effect, therefore, of acreage shifts, new plantings, and attendant factors in the two districts combined has given rise to steady increases in total acreage in valencia oranges for the two districts taken together, while bearing acreage has been relatively stable if the recent period 1958-1964 is considered as a whole.

One further comment on bearing acreage trends and district comparison: When the two districts are considered as orange producing areas of the two major varieties combined, the last seven years have brought total acreage figures much closer together, as the central district increased total acreage steadily and total acreage fell almost as steadily in the southern district (see Table 74). This southern decline was alleviated slightly in 1964 when a small increase of 300 total acres was recorded. In bearing acreage, although

TABLE 73

Valencia Oranges: Bearing and Nonbearing Acreage
Central District, 1958-1964

Year ending December 1	Acreage		
	Bearing	Nonbearing	Total
1958	11,543	1,287	12,830
1959	11,920	1,956	13,876
1960	12,150	4,118	16,268
1961	12,556	8,057	20,613
1962	13,734	9,974	23,708
1963	14,713	10,427	25,140
1964	18,547	8,714	27,261
Acres harvested, 1945-46			
	13,103		

Source: Developed by the authors from mimeographed bulletins from the administrative committees. See page 181.

TABLE 74

Navel and Valencia Oranges: Total Bearing and Nonbearing Acreage
Central and Southern Districts, 1958-1964

Year ending December 1	Central district acreage			Southern district acreage		
	Bearing	Non- bearing	Total	Bearing	Non- bearing	Total
1958	42,543	7,944	50,487	103,349	2,788	106,137
1959	44,320	7,644	51,964	102,800	3,139	105,939
1960	45,546	11,790	57,336	99,200	4,571	103,771
1961	47,891	17,592	65,483	93,028	4,510	97,538
1962	51,136	21,239	72,375	88,417	5,887	94,304
1963	54,506	21,824	76,330	84,187	7,152	91,339
1964	62,797	21,760	84,557	81,817	9,834	91,651

Source: Developed by the authors from mimeographed bulletins from the administrative committees. See page 181.

the increases of the central district have been steady and decreases of the southern district equally as steady, the total bearing orange acreage in the south is still nearly 2,000 acres greater than that of the central district.

Pattern and Overlapping of District Valencia Shipments

In summarizing the overlapping of shipments and within-season distribution of valencia fresh shipments in the two districts, the conclusions noted for navel oranges are indicative here, also. The predominant factor is, of course, the established stability and size of fresh shipments of valencia oranges from the southern district. This so dominates the production pattern that overlapping shipments must be evaluated in terms of their relationship to southern valencia shipments rather than in any other fashion. For the same reason, southern valencia fresh shipments are more noticeably affected or "overlapped" than any others because of their own established pattern which has not changed materially over the two decades under observation. Some shifting forward in central valencia shipments, noted after the dual marketing orders were first in operation, is now somewhat less evident; and more marked shifting forward of within-season cumulative shipments of southern valencias is following the same course in recent years.

The brief survey of overlapping of District III shipments with the other districts which were studied more in depth is also of particular relevance to valencias. The larger percentage of the Arizona-Desert-Valley acreage is, after all, in valencias, and most new and projected plantings there are also in valencias. Southern district valencias, therefore, have the present prospect of more rather than less overlapping of fresh shipments for the decade to come. The very fact that the allocations are made within a closely controlled context--both of industry and of marketing order--indicates that the southern district will make the necessary adjustments without too great difficulty, if past experience necessitated by the growth of the central district is a criterion.

Industry sources have offered a compilation of new plantings in the three districts which indicate, but do not explain, an extremely high increase in navel acreage to be planted in the central district in 1964 and 1965 (see Table 75). These estimates may be based on availability of land in favorable climatic areas with possibilities of irrigation rather than a more specific

TABLE 75

Navel and Valencia Orange Plantings
by Districts, 1956-1965

Year ending December 1	District I		District II		District III	
	Navels	Valencias	Navels	Valencias	Navels	Valencias
	acres					
1956	1,500	a/				243
1957	3,304	433	500	500		848
1958	3,223	774	529	637		1,090
1959	3,049	1,432	228	1,249	200	1,772
1960	3,849	2,449	274	1,157	600	2,430
1961	3,680	3,935	323	1,118	194	2,201
1962	4,115	3,080	306	1,804	180	1,694
1963	2,779	1,365	721	3,046	161	2,421
1964 ^{b/}	6,300	2,100	700	3,000	200	2,500
1965 ^{b/}	6,300	2,100	500	3,000	200	4,500

a/ Blanks indicate no acreage recorded.

b/ Estimated.

Source: Private industry data.

tabulation of intentions to plant. However the projections are obtained, the figures given for 1957-1963 for the central district are particularly interesting in these respects:

For navels:

1. The jump in new plantings in 1957.
2. The stability of the range of new plantings which on an average vary around 3,500 acres per year for the period.

For valencias:

1. The fact that new plantings were attempted after 1956 reaching a peak close to 4,000 acres recorded for 1961.
2. Decreases predicted for 1964 and 1965 despite constant increases shown for the later 1950's.

The two varieties compared:

1. New plantings are concentrating in navels in the central district after an initial surge in new valencia acreage.
2. New plantings in valencias in District II in 1963 equaled the average new plantings in District I for navels, and industry expectations note a continuation of 3,000 acres in valencia plantings in the southern district.

The District III increases, largely in valencias, are sizable although fluctuating, but the projections for 1965 show a 75 percent increase. This projection may include specific knowledge of acreage figures attributed to a newly developing Arizona project. The most ambitious of these contemplates a new investment arrangement by a development corporation with a ranch-winter home with citrus acreage orientation for eastern investors combining tax deduction advantages (much as in the earlier central district development but on a larger scale) with advanced commercial management techniques. The settlement of the allocation of Colorado River water is a very important background factor in this development.

Problems for Projected Production

In summary, consider the indications of higher per carton and per acre cultural cost in the southern district with the possibility that cultural costs of valencias exceed those for navels. If we add to this the definite trend toward a smaller percentage of an even smaller total crop of valencias going into fresh shipments in both districts, it is hardly surprising that new acreage was not going into valencia orange plantings to any large degree in either district in California during the 1950's. It is particularly understandable that the central district has shown very strong growth and expansion in navel oranges throughout this same period.

Yet, the situation in the 1960's has changed noticeably. Increasingly new valencia acreage has been planted, and projected acreage known to the citrus industry is contemplated in large amounts. This is true in both districts and in the Arizona-Desert-Valley area. The increases in valencia acreage in the central district are not as great as in the southern district; yet, they represent the fact that research and development have overcome the more difficult conditions under which valencias can be planted, grown, and stored in the San Joaquin Valley.

The trends in costs of production, no matter how incomplete the data, seem not to have been interrupted, however, nor have the production, size, or distribution trends that have been traced throughout the decades. Therefore, it is tempting to suggest that the current growth in valencia acreage coming into production may be in part the result of a lessening of tensions over the problem of overlapping valencia shipments by the introduction of new producing areas. This overlapping was indeed considered to be a problem for the grower, and increases could be measured in time and volume in the mid-1950's. Since that time, although volume of overlap has increased, length and within-season overlap seem to have been regularized to an extent that the valencia growers (either established or new) may not view the effects of overlapping shipment with the concern they once showed. It is also possible that the regional competition from Florida, which is more noticeable for valencias than navels, may have been impeded indefinitely after the severe losses from freeze several years ago.

Citrus growers, like other California agriculturists, seem to prefer to remain with a familiar crop and look to new acreage which will support the

crop they have often abandoned to urban sprawl. Thus, with increased income from sale of older acreage, valencia growers can, in many areas, afford to put more into the cost of production of valencias. Nonetheless, as economically sophisticated members of a well-established, thoroughly directed industry, they must be anticipating increased returns from the new plantings and increased acreage in each of the districts. Entry, of course, cannot be controlled under the federal marketing order auspices nor any other articulated industry restraint; but citrus acreage is too great an investment and requires too long a period of cultivation preceding maturity not to be carefully integrated into ongoing market channels.

If this is not the case--that is, if the anticipated demand for valencia oranges is not able to absorb the contemplated production, which is actually declining in total terms--the allocation will again be of paramount importance; and length and pattern of overlap, which now seem to be stabilized, may be subject to shifts and adjustments as noted in the high-growth period of the mid-1950's. Since that growth period was stronger for navels than for valencias, the situation may not be entirely parallel nor the "smoothing out" quite the same with the acreage increases concentrated in valencia production.

Two-District Comparison for Combined Varieties

When the two orange producing districts are considered as separate units--each growing a navel and valencia orange crop every year--rather than comparing the variety grown in each district, the comparative situations of the districts as a whole can be summarized briefly.

In Table 76, total production by district and estimated yield per acre of each district, combining the two varieties, have been compiled. In addition, each district's yield and production have been related to that experienced in 1945-46. In this way, the striking growth of the central district as a whole is observed--nearly doubling production by 1963-64 over 1945-46. The southern district decreases are equally striking where total orange production is now at half the figure it was in 1945-46.

When yield figures are compared for the two districts, in large part the picture is still a most fluctuating one. In the immediate postwar period, the actual yield per acre when both varieties of oranges are combined was greater in the southern district than in the central district in every year but one.

TABLE 76

Navel and Valencia Oranges Combined: Total Production and Total Yield Per Acre
Central and Southern Districts

Crop year	Total production				Total yield per acre			
	Central	Southern	Central	Southern	Central	Southern	Central	Southern
	standard	carloads	index, 1945-46 = 100		cartons		index, 1945-46 = 100	
1945-46	13,935	72,669	100	100	328.5	375.2	100	100
1946-47	21,306	83,910	153	115	503.9	434.1	153	116
1947-48	17,908	72,321	129	100	422.6	380.9	129	102
1948-49	9,266	63,130	66	87	252.1	358.0	77	95
1949-50	11,634	70,344	83	97	292.6	396.1	89	106
1950-51	12,585	76,214	90	105	305.3	436.9	93	116
1951-52	11,071	40,775	79	56	a/			
1952-53	15,818	56,360	114	78				
1953-54	18,448	45,136	132	62	467.4	313.1	142	83
1954-55	20,482	57,298	147	79	517.5	437.3	158	117
1955-56	18,710	56,631	134	78	472.6	476.3	144	127
1956-57	21,128	49,418	152	68	525.0	441.3	160	118
1957-58	16,870	28,106	121	39	416.4	266.8	127	71
1958-59	26,616	52,192	191	72	629.2	504.0	192	134
1959-60	21,079	39,015	151	54	476.6	389.7	145	104
1960-61	11,987	37,184	86	51	262.8	396.8	80	106
1961-62	9,484	30,958	68	43	193.1	346.0	59	92
1962-63	19,567	36,625	140	50	375.5	432.6	114	115
1963-64	26,661	35,415	191	49	457.0	429.3	139	114

a/ Blanks indicate comparable data not available for the two years when a fresh shipping marketing order was not operating.

Source: Based on Tables 1, 6, 14, and 16.

With the initiation of the two marketing orders, a line of demarcation used throughout the study, this situation was reversed, and the five-year average for the central district of 480 cartons per acre was considerably higher than that of the southern district which registered 387 cartons per acre. The second five-year period, 1958-59 through 1962-63, included two short-crop years for the central California district; therefore, the position of the two districts was once more reversed, with the central district averaging 387 cartons per acre annually for the five-year period and the southern district's annual average estimated at 414 cartons per acre. In 1963-64, the latest year of record, the yield figures are very close for the two districts--457 cartons per acre for the central district and 429 cartons per acre for the southern district. When yield for the years is considered relatively, the yield for the central district in the last decade has been considerably greater than that of 1945-46 with the exception of 1960-61 through 1961-62, while that of the southern district has also shown increased yields over the 1945-46 base but in the range of 15-20 percent greater rather than the 50 percent greater figure often recorded in the central district. In assessing this finding, it should be noted again that older acreage tended to run 80-85 trees per acre, but new acreage had been planted anywhere from 90 to 125 trees per acre; therefore, greater yield per acre could well be expected from newer plantings, a larger proportion of which have been in the central district. However, it should be observed that interplantings (both vertical and horizontal) of older more established acreages regularly take place. This acreage would not be designated as "new" or "nonbearing" but might give substantially greater yield in the future as well as accounting for some of the increased yield in the recent past.

Improved cultural practices--treated rootstocks, additional irrigation, and a possible decrease in marginal orchard land--must also be remembered as influencing yield over time. But, even with all these considerations in mind, no combination of factors seems very likely in the future to result in notable increases in production of oranges in southern California.

Generalizing as to the trends in the southern and central districts in the producing of oranges since World War II, the first conclusion is that the southern district is declining in importance in the production of both varieties of oranges although it still dominates the valencia picture. The second conclusion is that, although the central district is growing in

importance in California orange production and impressive as its development is, it is as much the decline in the south that emphasizes this shift as it is the increases in the central district itself. From a comparative point of view, thirdly, it would seem likely that the combination of all considerations favor future growth in the central district rather than any marked improvement in the conditions for orange growing in southern California and that some indications point to better general conditions for higher economic returns to central district growers than to southern growers. Although many other economic considerations besides those inherent in orange production itself have assisted in this direction--to mention only one or two, the shift in land utilization to suburban and industrial uses in the south and the development of inexpensive and plentiful water for the San Joaquin foothills--our data have shown the tendency of trends within the orange production segment of the agricultural picture to recognize and institutionalize these advantages in the central district's favor, a development which may, indeed, be a logical outcome of the changing relationship of California's agricultural and industrial growth.

SOURCES

Tables 1, 4, 6, 9, 12-14, 17, 19, 22, 25-64,
and 69-74 and Diagrams I and II

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Occasional mimeographed bulletins from both committees.

Tables 65, 66, and 67

California-Arizona Citrus League (prior to January, 1965, California Citrus League). California-Arizona Citrus Cost of Production. Los Angeles, annual issues. (Variously titled.)

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